Rubber Journal and International Plastics

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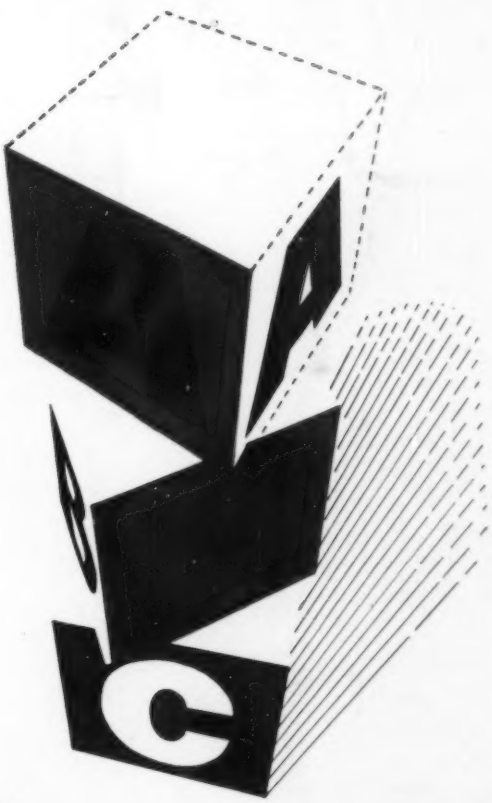

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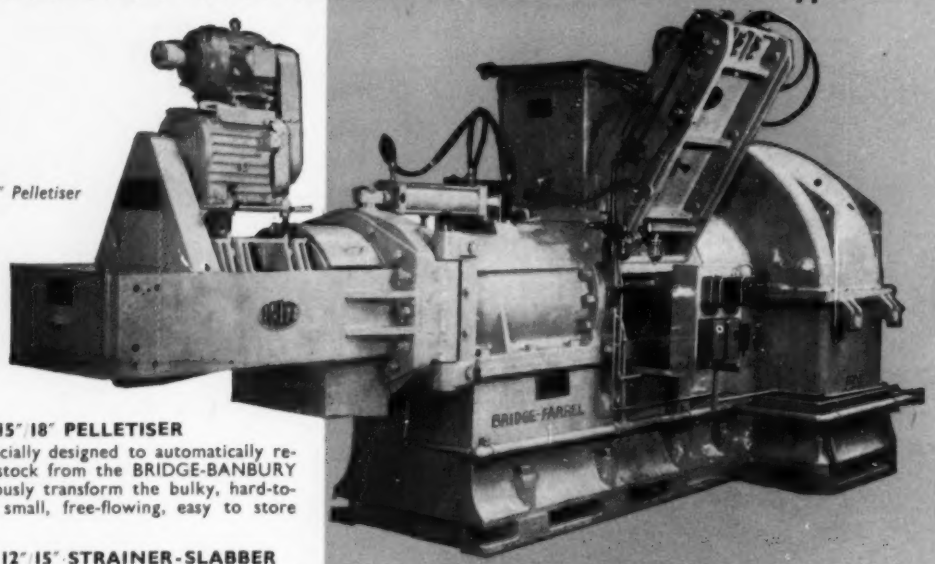

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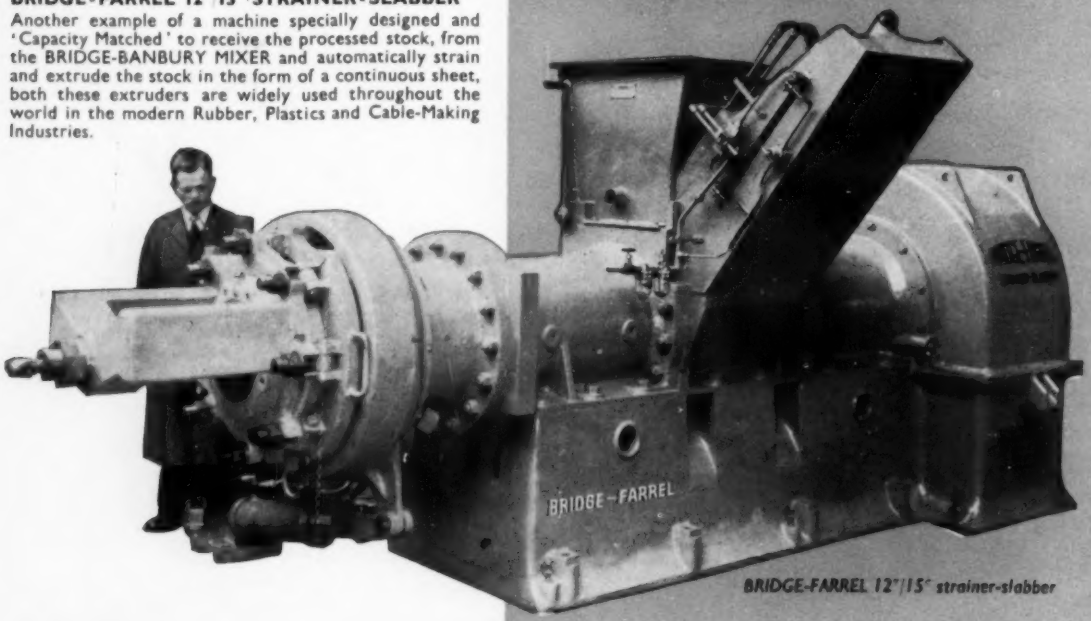

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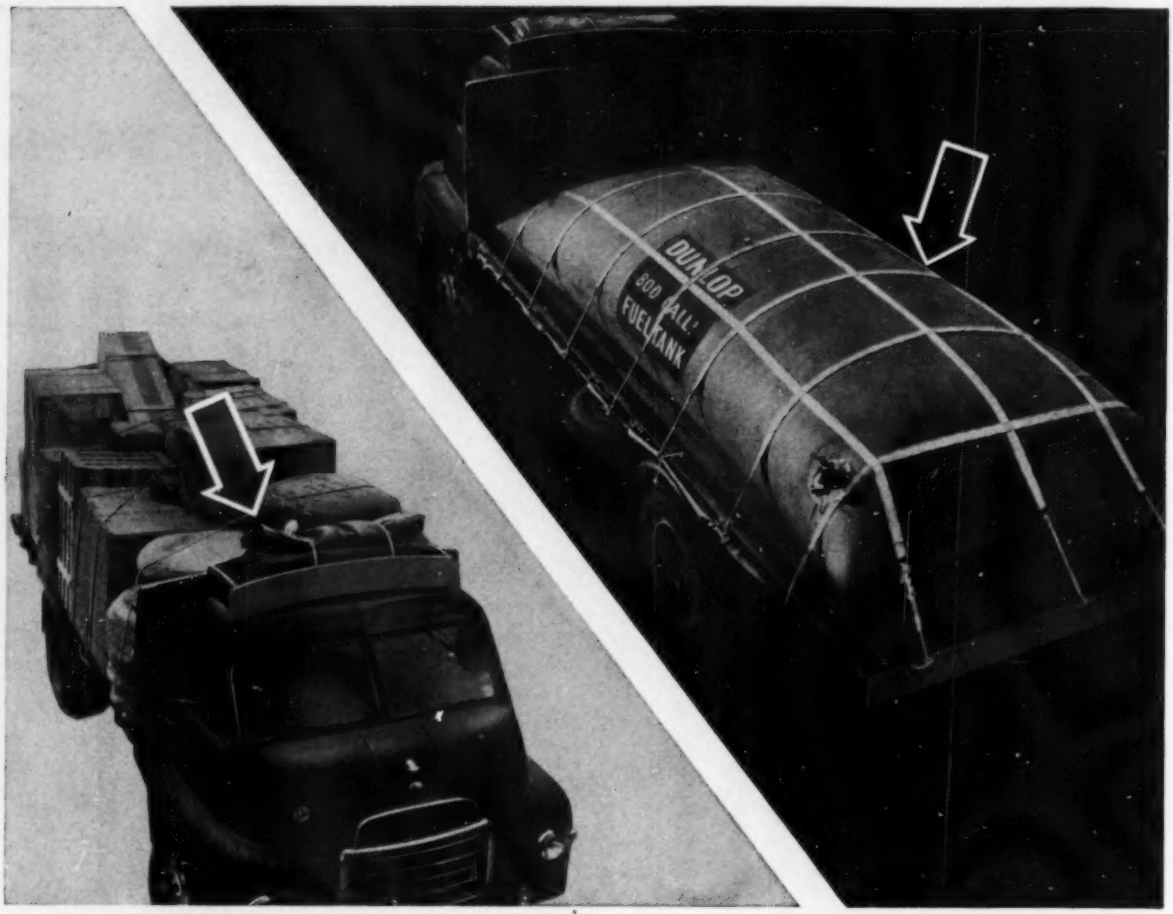

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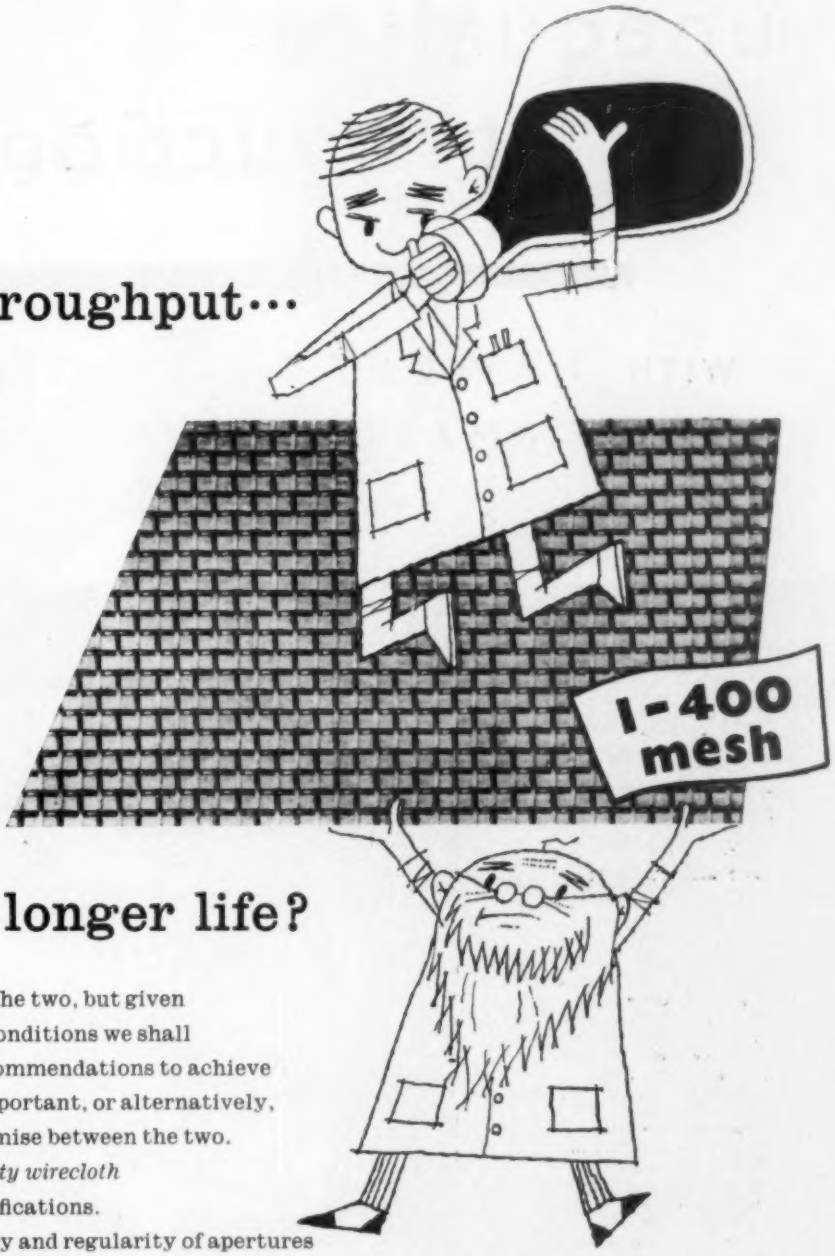

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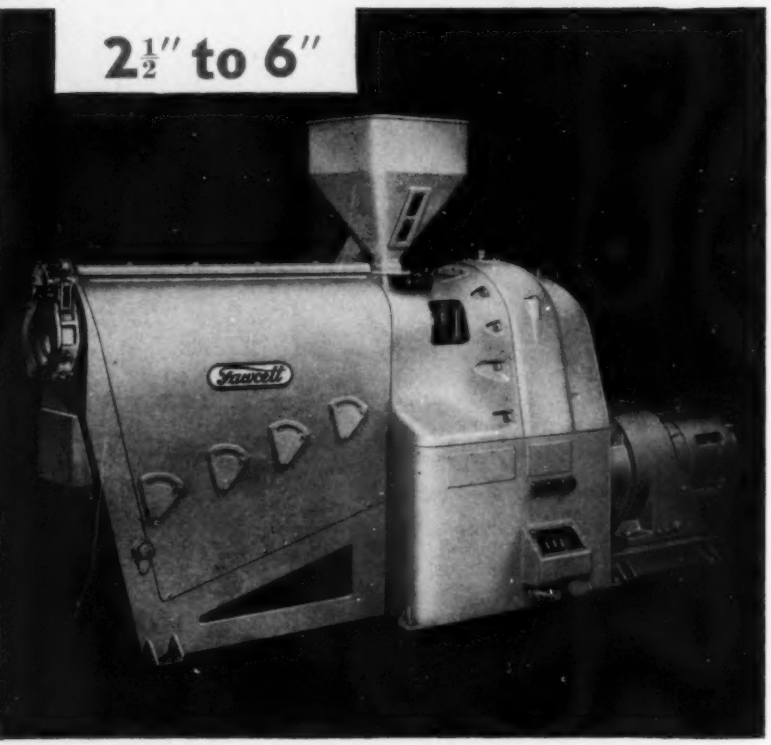

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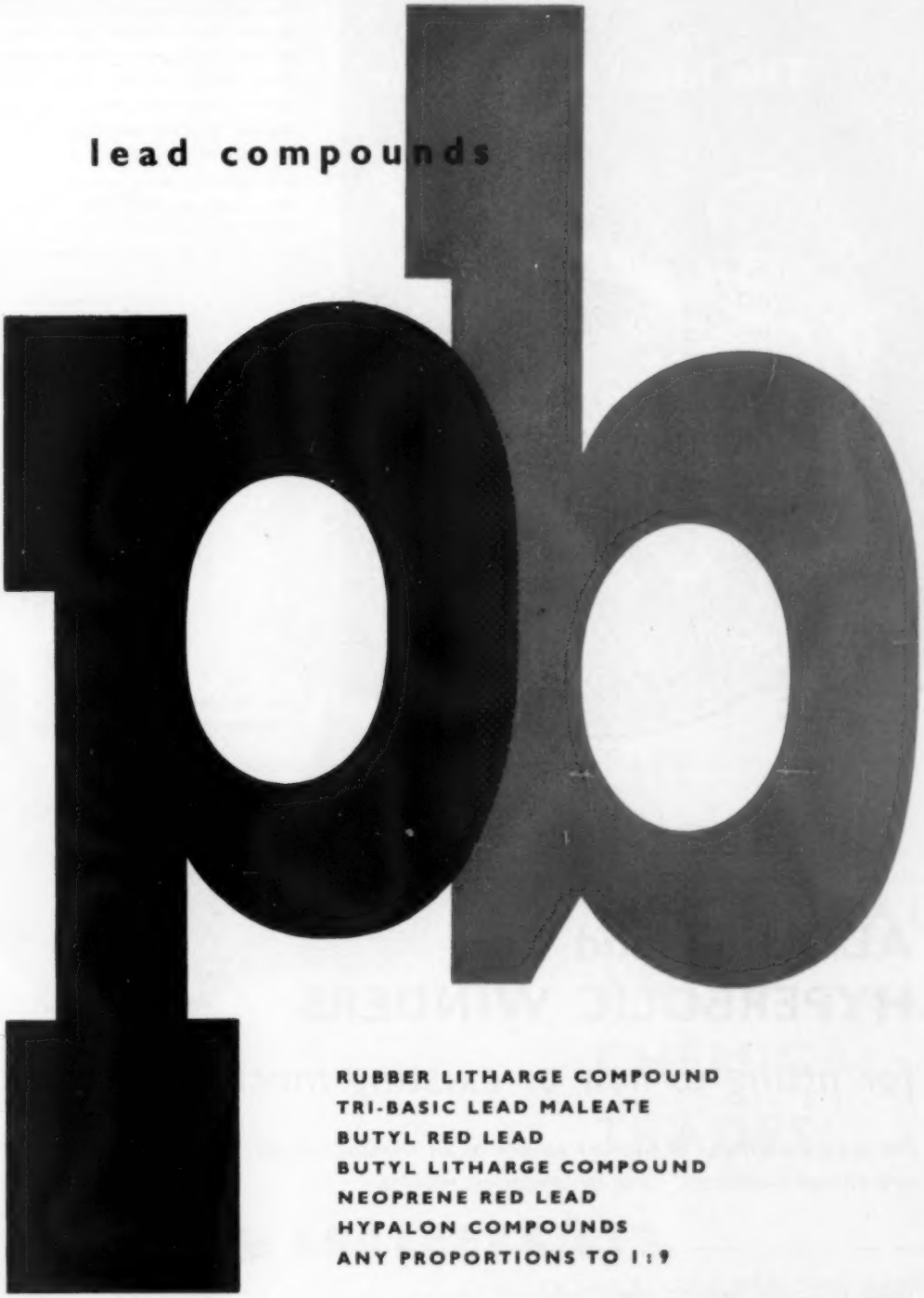

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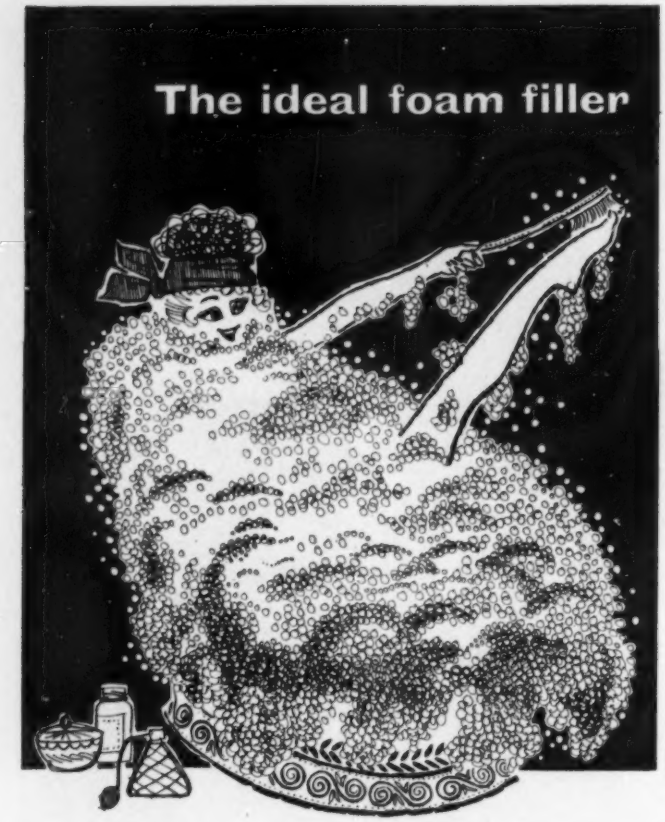

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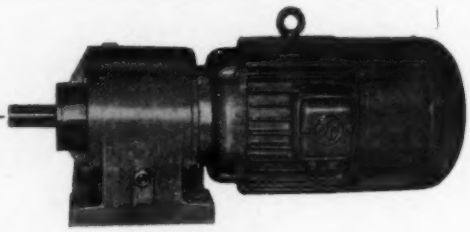

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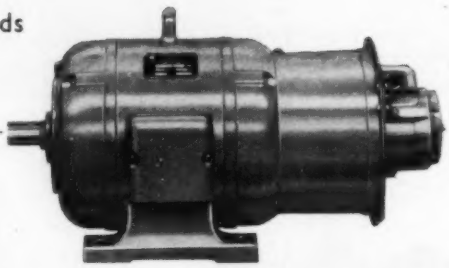

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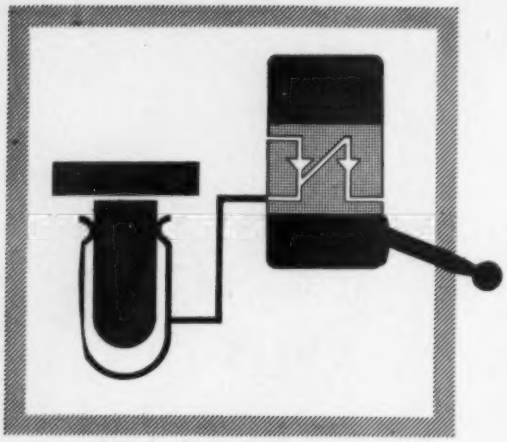

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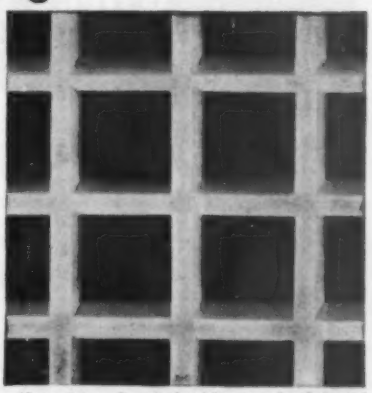

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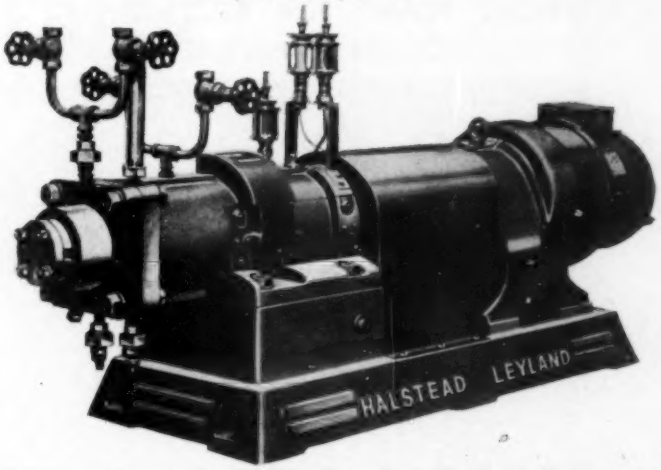

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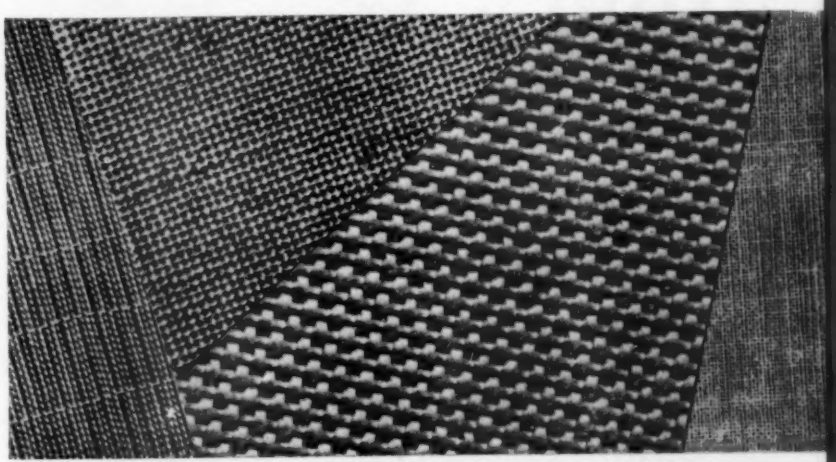

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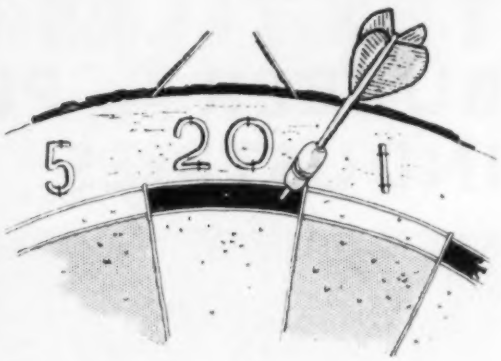

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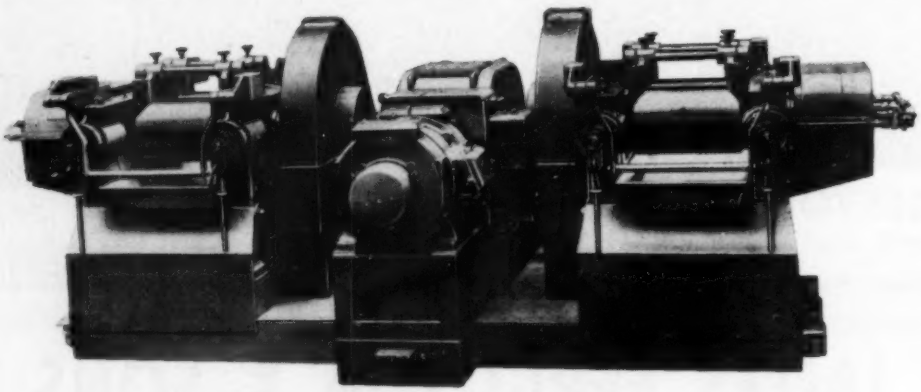

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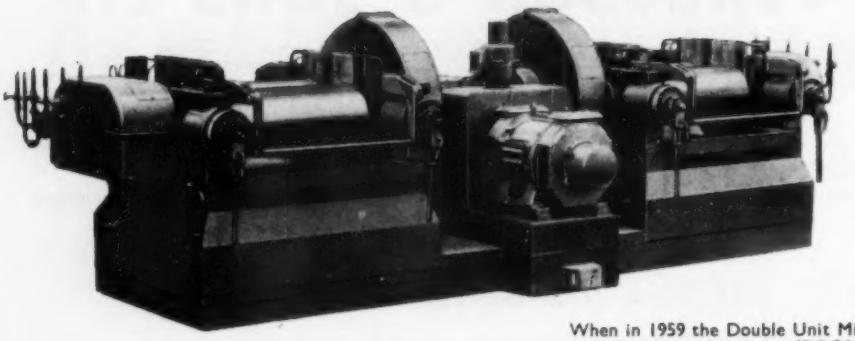

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IN ITS 77th YEAR

September 10 1960

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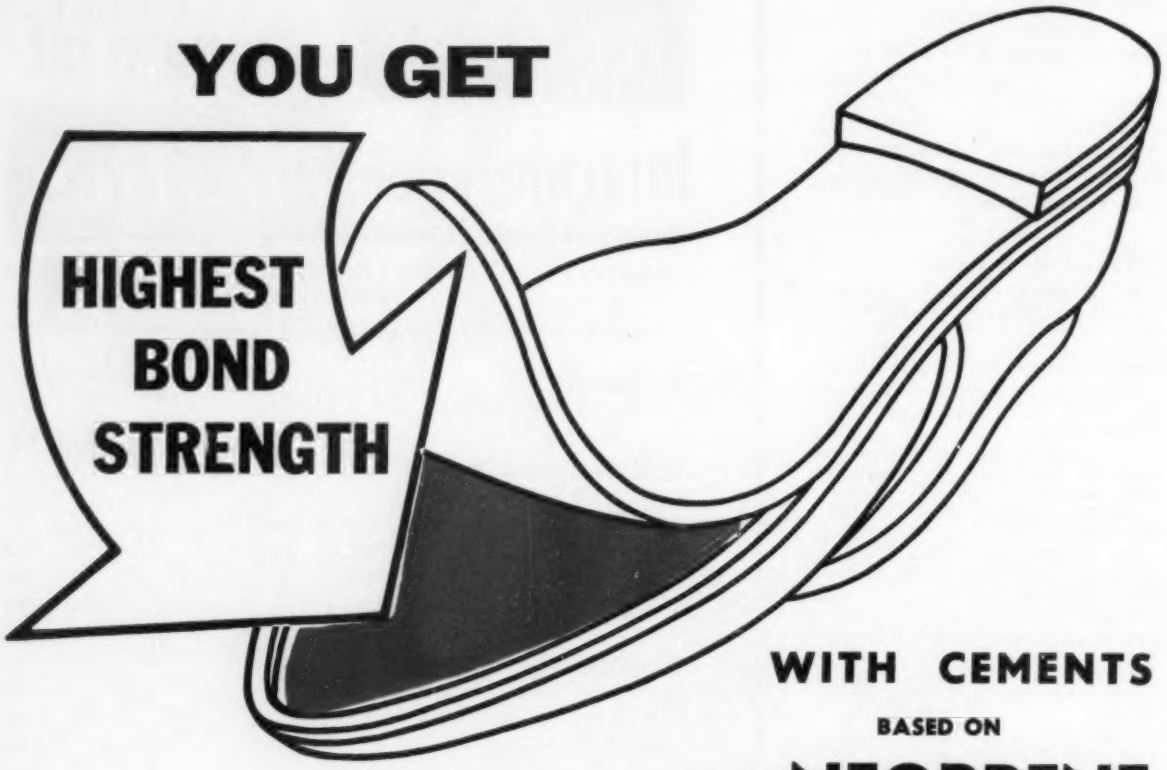

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NOTES of the WEEK

Controlling Quality

THE vital importance of quality control was stressed by many speakers at last week's fourth annual conference of the European Organization for Quality Control, held in London. Opening the conference, Mr F. J. Erroll, Minister of State, Board of Trade, said ' Quality control is everybody's business whatever industry he may be in.' Mr Frank Nixon, president of the organization, and chief quality engineer of the Rolls-Royce aero engine division, said a depressingly large proportion of industry failed to recognize the value of quality control. He is reported as saying that ' When it is realised that our direct production operatives are each making something between £100 and £300 worth of spoilt work per year, priced at factory costs, we can see what can be achieved by controlling product quality.'

The advantages of maintaining high standards from the point of view of the manufacturer were emphasized by Sir Bertram Waring, deputy chairman of the British Productivity Council. He went on to say, ' The more automatic manufacturing methods become, the greater the risk that one individual's lack of conscientiousness or skill would impair the quality of a great volume of products. In the end, as in all industrial activities, it is the people who count.'

The definition of quality control given by the German Federal Republic's Procurement Office was quoted by Dr Walter Masing, West Germany. This reads. ' The quality of a product is equivalent to the extent to which it meets the customer's demands.'

This definition sounds fine at first hearing, but it may not be, perhaps, precisely what some people mean by quality control. Mr Nixon, it seems to us, commented aptly when he said that the establishment of standards of requisite quality would probably be influenced in no small degree by the reputation, tradition and past performance of the company.

Consumer Doldrums

THE Radio Show is one of the biggest public exhibitions in the UK. Now that the dust has cleared a little from the show that finished last week, it turns out that this—the twenty-seventh—was a record. This is good news for plastics, for the radio industry has been a considerable consumer ever since the early days of the 1920s. The two industries have always worked very closely together, and it has been said that without plastics the radio industry could never have reached its present technical level.

Before the war radio cabinets were compression moulded in phenolics—producing the gravy-brown mottled effect that seemed for a long time to be an essential part of receiving wireless waves. Now, of course, receivers are mainly injection moulded, and are produced in an astonishing variety of styles and colours. The 1960 show emphasized the use of injection moulded parts: many TV sets incorporated moulded implosion guards and escutcheons as well as the usual decorative tuner knobs. PVC sheet is being increasingly used for covering record players, portable radios and so on; and most TV sets get a high-gloss polyester finish. The present demand for transistors and tape recorders mean more work for plastics, since the printed circuit is usually deposited in a phenolic base.

A gloomy note struck during the show was that there was no indication that TV sales would recover from the doldrums. This point has been widely discussed and it comes down to the familiar fact that in this field—and in the field of consumer durables generally—we are not exporting enough. UK exports of radio and TV sets in the first half of this year added up to only £1,682,000: a pitifully small amount. Many moulders are directly concerned with these consumer sales and, even though they have learnt not to put all their tooling eggs in one consumer basket, finding fresh outlets and working out new production schedules is a costly business. If the consumer market is going to continue to be sluggish, then it would pay the manufacturer of plastics components to make a stronger effort himself in the exports field, where he may find a more buoyant market.

Prehistoric Exports

WE cannot bring ourselves to use that time-honoured phrase ' truth is stranger than fiction ' so will be content merely to say that some mighty odd things happen. Such as, for instance, the export of coracles. That there should be an overseas market for these prehistoric vessels may be hard to believe, but it is a fact. Coracles made at Cenarth, Wales, are being exported to the United States for use by a New York angling club. These woven willow craft topped with hazel and covered with pitch-proofed canvas are fine things—as the American anglers have found—for lake fishing. They are, apparently, remarkably stable, once you are in.

Two points, at least, arise. First, more things can be exported than are dreamed of by many export managers; second, coracles would seem to lend themselves to glass-reinforced polyester resin construction. There is a third point: it will be noted that this particular export is yet another example of the successful selling overseas of a specialized product.

NEWS *Briefs*

COLOMBIA'S FIRST PVC PLANT — CUBA SEIZES US PLANTS—NEW ENJAY RESINS—COFRABLACK ON STREAM SOON—ALLIED NYLON EXPANSION

●**United States** — Enjay Chemical Co., a division of Humble and Refining Co., are producing two new resins on a commercial scale. Enjay's plants in Baton Rouge, Louisiana, and in Bayonne, New Jersey, are producing the resins at a capacity rated at 10m. lb. per year. The new resins, based on butadiene-styrene polymers, are expected to find use in such coating applications as appliances, industrial, furniture and machine finishes; metal and automative primers; drum enamels; and can, pipe, tanks, gasket and wire coatings.

●**Canada** — A multi-million dollar tyre plant will be built at Kitchener, Ontario, by B. F. Goodrich Canada, if current negotiations for a 100-acre site are successful, the company announced. One source reports the amount involved would be in excess of $7m. Dr R. V. Yobe, president of B. F. Goodrich Canada, said the plant would be the most modern tyre production unit in the world. At present, B. F. Goodrich Canada manufactures rubber at its central plant in Kitchener.

●**United Kingdom** — Sales from the UK natural rubber stockpile totalled 2,400 tons in August, leaving 33,074 tons available for sale on September 1. There were no sales for spot delivery; 95 tons were sold for September delivery, 1,290 for October and 1,015 for November. Sales in July totalled 3,521 tons.

●**Italy** — Montecatini, of Milan, have been granted a licence by Chemische Werke Witten, who manufacture fibres and plastics raw materials for the production of dimethyl-terephthalate by the patented Katschmann process. Dimethyl-terephthalate is a basis for the manufacture of polyester fibres, known in Germany under the 'Trevira' trademark. The German company will make its technical knowledge available to Montecatini in constructing plant. Similar licences have been granted to a French and a US firm, while Chemische Werke Witten's technical know-how has also been used in the building of a plastics fibres plant in the USSR.

●**Cuba** — The Cuban Government has taken over three American tyre factories valued at 25 million dollars after workers had accused the companies of cutting production to 'sabotage' the regime. (*RJIP* September 3, 336). The three factories, belonging to United States Rubber, Firestone and Goodyear, are all in the industrial town of San Jose de las Lajas, about 20 miles south of Havana. US Rubber's plant is estimated to be worth $10m., Goodyear's $8m., and the Firestone factory $7m. Goodrich's plant — 80% of which is owned by a Mexican subsidiary — was not affected by the 'intervention.'

●**Ghana** — Under a trade agreement signed in Accra between Ghana and the USSR, Ghana will supply Russia with a variety of products, including rubber, in exchange for machinery and chemical goods. The Soviet Union has extended a long-term credit equivalent to about £15m. to help pay the expenses of rendering technical assistance.

●**Colombia** — B. F. Goodrich is to build a factory for the manufacture of Geon vinyl plastic materials in co-operation with Colombian firms. A new company is now being formed, and the factory will be located near the plant of Planta Colombiana De Soda at Zipaquira, near Bogota. This plant will feed the new factory with chlorine. Construction will get underway shortly and production is expected to begin in early 1962. The plant will be the first to produce polyvinyl chloride in Colombia.

●**France** — France's first carbon black plant being built at Beck d'Ambes by Cofrablack, will start production in November. Cofrablack — a company formed by the Philips Petroleum Co. and Continental Carbon — will use natural gas from Lacq.

●**United States** — Construction will begin this month on a major caprolactam monomer project at the Hopwell, Virginia, plant of the national aniline division of Allied Chemical Corporation. The project which is in the hands of Lummus of New York, is scheduled for completion in mid-1961. The expansion will double Allied's production of caprolactam monomer and, it is claimed, will make the plant the largest caprolactam producer in the world. The caprolactam monomer produced will be used in other Allied plants for the production of nylon 6 tyre and textile yarns.

'I kept my wellingtons on — did you?'—501

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New Latex Concentration Plant

INCREASED OUTPUT OF SYNTHETIC RUBBER

AS reported in *RJIP* September 3 p. 360, the output of the International Synthetic Rubber Company's £6 million plant at Hythe, Southampton, is being expanded to 90,000 tons a year. If justified by demand, this may rise still further and reach 100,000 tons during 1961. The majority of this Styrene Butadiene Rubber is sold as solid rubber, but production of latex is also being expanded and may reach 7,000 tons by the end of this year.

The most recent addition to the plant on the 54-acre site is equipment for the production of high solids latex by a process which produces latex with solids content in excess of 62%.

This material was designed principally for the manufacture of foam rubber and foams made from mixtures of natural and synthetic latex are already being extensively used by the Dunlop Rubber Company, pioneers in the manufacture of latex foam in this country and by Vitafoam Ltd., who claim to be the largest foam users in Europe. Foam produced with 25% of the man-made latex has met Society of Motor Manufacture and Trades' specifications. This blend also produces foam of a more even quality, with better light resistance and ageing characteristics, and results in fewer factory rejects.

The expansion of a UK source of SBR latex, with its assurance of stable price and economic delivery, will be of great benefit to the future of the latex foam industry, allow expansions in the use of the material and reduce demands for foreign exchange.

The main problem in the production of a high solids content latex is that the viscosity of the solution increases and the material becomes difficult to handle and process. The system in use in the new plant at Hythe is very simple and allows the concentration of a latex solution from approximately 25% solids to 62% or more with only a very slight increase of viscosity.

This is achieved by passing the latex solution in a thin film over the surface of a cooled drum, at a temperature below its freezing point. The enormous pressures exerted on the latex particles by the water freezing causes them to coagulate and increases the particle size approximately fourfold. The frozen latex is then passed into tanks where the temperature is raised and the excess water evaporated off to produce the desired concentration.

The development and technical service facilities at the plant are also being increased and the laboratory, although not yet fully equipped, will have all the expert staff, apparatus and machinery necessary to deal with any problems likely to arise.

Polydienes in Canada

Polydiene rubbers may be manufactured in Canada. Dr R. V. Yohe, president of Goodrich of Canada, said a licensed arrangement to produce the rubber in Canada was now possible following a consent decree issued by the US District Court for the District of Columbia.

I.C.I. TO MAKE POLYPROPYLENE FIBRE

As briefly reported in last week's *RJIP*, a patent licence agreement for the exclusive production in the UK of staple fibres, filament yarns and textile monofilaments from polypropylene was signed in Zurich on August 30 between Imperial Chemical Industries and Montecatini of Milan.

I.C.I. is already licensed by Montecatini to produce polypropylene for use as a plastic, and I.C.I.'s plant to make 10,000 tons a year of this polymer will come into operation at Wilton, Yorkshire, later this year.

Polypropylene fibres are the outcome of the researches of Professor Giulio Natta, and of Montecatini.

The properties of polypropylene fibres — high strength, durability, lightness — are expected to lead to a wide range of applications. Alone, or in combination with other textile fibres, they will probably find uses in, for example, the apparel, carpet, household textile, rope and cordage industries.

UK Agents Appointed for Lacq Sulphur

K. W. CHEMICALS have been appointed UK representatives of French concern Société Nationale Des Pétroles D'Aquitaine for Lacq Sulphur. They have been granted exclusive concessions in the UK as stockists and grinders, and have concluded partnership agreements for these concessions with Wm. Blythe and Co. Ltd., of Accrington.

Lacq, at the foot of the Pyrenees, contains one of the largest deposits of sulphurous gas. Société Nationale have constructed the world's biggest sulphur plant on the site: 175 cubic feet of gas are treated every day. In 1961 when full capacity is expected to be reached, 1.4m. tons of sulphur will be produced a year.

K. W. Chemicals handle a wide variety of around 80 products; one of the company's divisions is concerned with plastics fabrication.

Eighty-one Papers at KL

A total of 81 papers are to be delivered at the Natural Rubber Research Conference due to begin in Kuala Lumpur on September 26.

More than 200 scientists from research institutes, commercial firms and universities in the main rubber producing and consuming countries will take part in the talks.

Part of the International Synthetic Rubber Co.'s new technical service laboratory at Hythe

P.V.C.-coated 'Terylene' flexible ventilation ducting in use at Parsonage Colliery, Leigh, Lancashire

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'TERYLENE' Polyester ICI Fibre

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Radiation Work in Polymers

MORE PAPERS FROM THE MOSCOW SYMPOSIUM

THE papers delivered at the recent international symposium of macromolecular chemistry in Moscow covered a wide range of subjects. Summaries are given here of six lectures dealing with various aspects of polymerization and cross-linking, four by Russian scientists and two by Czechoslovakians. Considerable importance has been attached to the synthesis of graft and block copolymers says one of the Russian papers by Kh. U. Usmanov, U. N. Musaev and R. S. Tillaev. Such copolymers combine the properties of their polymeric constituents.

In order to form graft and block copolymers it is necessary that the starting material possess active centres, which may be groups, capable of forming free radicals. To carry out a graft or block copolymerization various chemical and physical methods yielding polymeric free radicals are employed. One of the new methods of synthesizing graft and block polymers is the radiation method.

In the present work the results of experiments on the formation of graft polystyrene and perchlorovinyl polymers with acrylonitrile by the action of gamma rays are presented. Co^{60} served as radiation source. The reaction was carried out by subjecting a swollen polystyrene film in acrylonitrile to doses of 1×10^6—4×10^6r. The resultant product was separated from the homopolymer by extraction. As the results obtained have shown, the percentage of grafting over the range studied increases with increasing radiation dose. The monomer unit to polymer ratio has been calculated from data on the nitrogen content.

Also a graft polymer of perchlorovinyl and acrylonitrile was obtained by preliminary irradiation of percholorovinyl in the presence of air.

The thermomechanical properties of the resultant polymers were investigated. The results showed that graft polymers of polystyrene and perchlorovinyl possess greater thermal stability than the initial polymers.

In the study the radiation polymerization of acrylonitrile was also carried out and the viscosity was measured of polyacrylonitrile solutions

A Czech paper given by M. Lazar, R. Rado and Yu. Pavlinets was concerned with methyl methacrylate grafting on polythene and polypropylene.

In a study of chemical modification of hydrocarbon polymers an investigation was made of the grafting of methylmethacrylate on to polypropylene and polythene. The grafting process was carried out both through preliminary polymer hydroperoxide formation and through chain transfer reactions.

The Grafting Process

Polymer hydroperoxide induced grafting proceeds via direct free radical initiation of side chain growth and via hydrogen atom transfer from the hydrocarbon polymer to the polymethylmethacrylate radical. The resulting polymer radical may initiate further grafting of the monomer, or become inactivated by reaction with other radicals. In order to determine the rates of the separate reactions in the grafting process, determinations were made of the rate constants of chain transfer between the polymethylmethacrylate radical and models of the hydrocarbon polymers. At the same time the contributions to the chain transfer reaction of radicals not participating in the grafting process were determined.

Grafting of polymethylmethacrylate also takes place on initiation of polymerization of the monomer in swollen polypropylene or polythene. Here the contributions to the chain transfer from the initiator and the methylmethacrylate radical were determined for the separate polymers. Since the grafting was carried out in swollen polymers the effect of viscosity of the medium on the course of the methylmethacrylate polymerization reaction was examined.

During the grafting of methylmethacrylate to polythene and polypropylene the possibility of cross-linking of these polymers arises.

Of particular interest is cross-linking of polypropylene in view of the fact that the direct reaction induced by ionizing radiation or by hydroperoxide decomposition is connected with certain complications brought about by degradation of the polymer backbone. In the case in question the formation of a cross-linked structure is due to recombination of the growing methylmethacrylate chains. The cross-linking of the graft polymer is hindered by the chain transfer reaction and by disproportionation during chain termination. In the case of methylmethacrylate the ratio between recombination and disproportionation is favourable to cross-linkage of the graft polymers, a fact which has been confirmed experimentally.

Based on the data concerning the chain transfer reactions and the conditions of formation and decomposition of polymer hydroperoxides a discussion has been presented of the most favourable procedures for grafting methylmethacrylate onto polypropylene and polythene and for the formation of cross-linked graft polymers.

Another paper given by the first two authors of the previous paper related to the free radical cross-linking of polythene.

Cross-linked polythene, owing to changes in structure, is a product with technically important properties. The cross-linking may be brought about with the aid of various free radical sources, such as ultraviolet light, ionizing irradiation of high intensities and organic peroxides. The kinetics and mechanism of the cross-linking process depend predominantly upon the source employed at the cross-linking of polythene, and in the case of peroxides also upon the chemical mechanism of the peroxide decomposition as well as upon the reaction of primary radicals with the polythene macromolecules.

When radiation is employed, the excited molecules after energy absorbtion dissociate, hydrogen is evolved and radicals from the polymer form cross-links. The hydrogen atom eliminated is quite mobile and easily removes another atom from the polymer. Hence during a single primary act two polymer radicals or one cross-link and one hydrogen molecule is formed. The number of cross-links as well as the amount of hydrogen produced are then simply proportional to the absorbed radiation dose.

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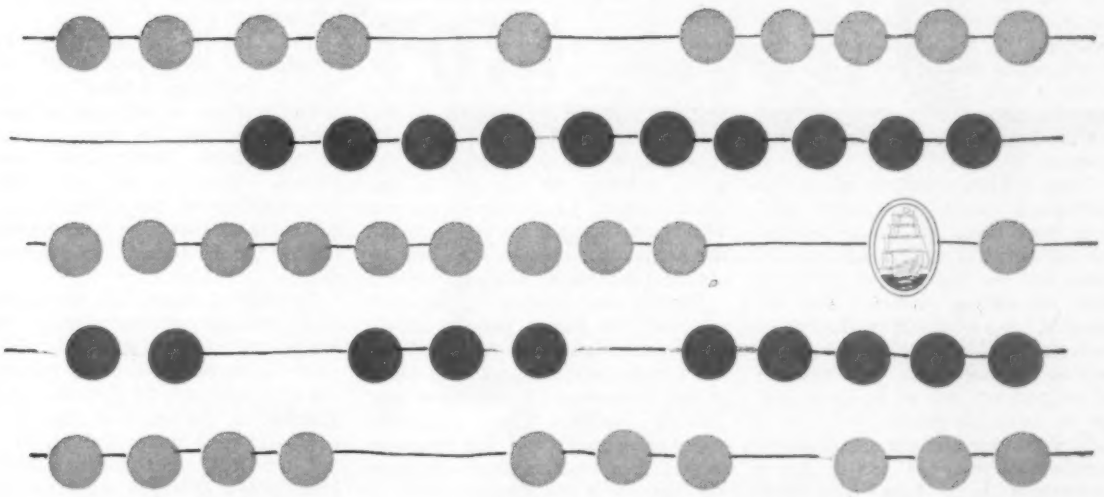

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cated process, the polymer radicals not forming directly, but by transfer to the polythene macromolecules of radicals, produced by peroxide decomposition. In the termination reaction, in addition to cross-linkages, products of the reaction between primary and polymer radicals may form. When the peroxide decomposes by a chain mechanism the dependence of the cross-links upon the initial peroxide concentration becomes more involved. In the induced decomposition the free radical sources are inefficiently consumed and owing to the difference in reaction orders of the simultaneous ineffective induced and effective self decomposition of the peroxide the ratio between the two reactions varies in the course of the process.

From a kinetic analysis of the experimental results quantitative relations have been established between the formation of cross-links in polythene and the free radicals produced from the various sources. Both the simplest cases of direct production of radicals capable of cross-linkage as well as the cases when the formation of the primary radicals is determined by the initiation process and rate of radical transfer and the nature of the termination reactions are of major importance have been considered. Finally a still more complicated case when cross-linking of polythene takes place during chain decomposition of the peroxide has been treated. With the aid of the derived equations and the experimentally determined rate constants the contents of the cross-links have been calculated and the results have been compared with experimental values.

Freezing Solutions

A. A. Berlin, E. A. Penskaya, G. I. Volkova (USSR) were the authors of a paper on 'Block copolymerization by the freezing of starch solutions.'

During the freezing (cryolysis) of aqueous solutions or suspensions of high molecular compounds, degradation of the macromolecules is observed due to the pressures obtaining in the phase transition and in the growth of ice crystals.

As a result of the cryolysis active degradation products are formed, prone to further chemical conversion.

Products of the cryolytic degradation of starch formed during single and repeated freezing of its solutions (from t = −4° to −195°C.) with subsequent thawing (to −3° to −4°C.) are characterized by enhanced reducing properties, increased iodine numbers, decreased h_{∞} values, the appearance of a water soluble fraction, a shift in maximum absorption of the iodine complex to the shorter wave lengths (from =580−600 mμ to 540−560 mμ) and a twofold increase in hydrolysis rate under the action of mineral acids. This is explained by degradation of the macromolecules and decrease in degree of polydispersity during the repeated freezing and thawing of the solutions or of the moist starch.

Prolonged storage of the thawed starch specimens in argon and in air at 20°C., as well as short heat treatment at 37°-75° (5-30min. respectively) leads to decrease in the reducing capacity, increase in h_{∞} and to a shift in the absorption maximum of the starch-iodine complex in the longer wave length direction. On adding free radical acceptors to the starch solution no changes in the characteristics have been observed. This gives grounds to the assumption that the relations are due to chemical conversions of macroradicals.

Heating the cryolytic degradation products for longer periods in air causes intensification of the hydrolysis. Such hydrolysis does not take place in an atmosphere of the inert gas. Heating under these conditions solutions of starch that had not been subjected to freezing does not cause any changes in the product.

The increased reactivity of starch cryolysis products in air is evidently the result of the formation of labile peroxides in the starch macromolecule.

The degradation of the initial soluble starch by dilute (0.15–0.25%) solutions of its cryolysate has been experimentally established.

In order to elucidate the effect of mechanical rupture of the chains on enzymatic activity, experiments were carried out on determination of the activity of the cryolytic degradation products of amylase and pepsin. It has been found that under suitable conditions of freezing and thawing sharp changes in the enzymatic activity during storage are brought about.

In contrast with the enzymes not subjected to this action the activity of the cryolysed enzymes increases and in a number of cases exceeds that of the original preparations.

The radical concept of degradation of starch and other polymers gave grounds for carrying out the block copolymerization of mixtures of polymers in solutions or in the presence of moisture by the method of repeated freezing and thawing in an inert gas atmosphere. The formation of block copolymers has been demonstrated on the example of the freezing of finely dispersed polystyrene emulsions as well as the styrene monomer in starch solution with varying ratios of the components.

A study of the resultant products showed that under the chosen conditions block copolymers of non-polar polystyrene blocks and polar starch blocks are formed.

Radiation Stability

A. N. Praednikov and In. Shen-Kan delivered a paper on the mechanism of the protective action of benzene rings in the radiolysis of polystyrene.

The cross-linking energy in the radiolysis of polystyrene is 100 fold that of polythene, whereas the free radical yield in the radiation of linear paraffins is only 5–6 times as much as that from alkylaromatic compounds. Therefore, the high radiation stability of polystyrene cannot be explained by the conventional scheme for the action of the benzene rings.

In order to explain the high radiation stability of polystyrene the mechanism of the reactions taking place during radiolysis of the polymer must be examined. A hydrogen atom liberated as the result of rupture of a C—H bond under the action of radiation may react in two ways by removal of a hydrogen atom from the aliphatic chain, and by addition to the double bond of the benzene ring with the formation of a free radical of the type of cyclohexadienyl. Owing to the low rate of diffusion in the vitrified polymers and the high rate of reaction with atomic hydrogen, the radicals formed in this way should be in the immediate vicinity of the primary radical. Interaction of the latter with the radical formed by removal of a hydrogen atom from the aliphatic chain will lead to the formation of cross-links.

As to the interaction between the primary radical and cyclohexadienyl this may take place in the following two ways. The radicals may recombine with each other to form cross-links or they may engage in a disproportionation reaction. Disproportionation will lead to restoration of the initial state and hence to the dissipation of energy without cross-link formation. This will result in a drop in efficiency of the cross-linking process, the energy for the formation of one cross-link increasing.

In order to obtain experimental verification of the above conceptions as to the mechanism of interaction of the primary and cyclohexadienyl radicals, the radiolysis of deuterated toluene $C_6H_5CD_3$ was studied at the temperature of liquid nitrogen. In that case the addition to the benzene

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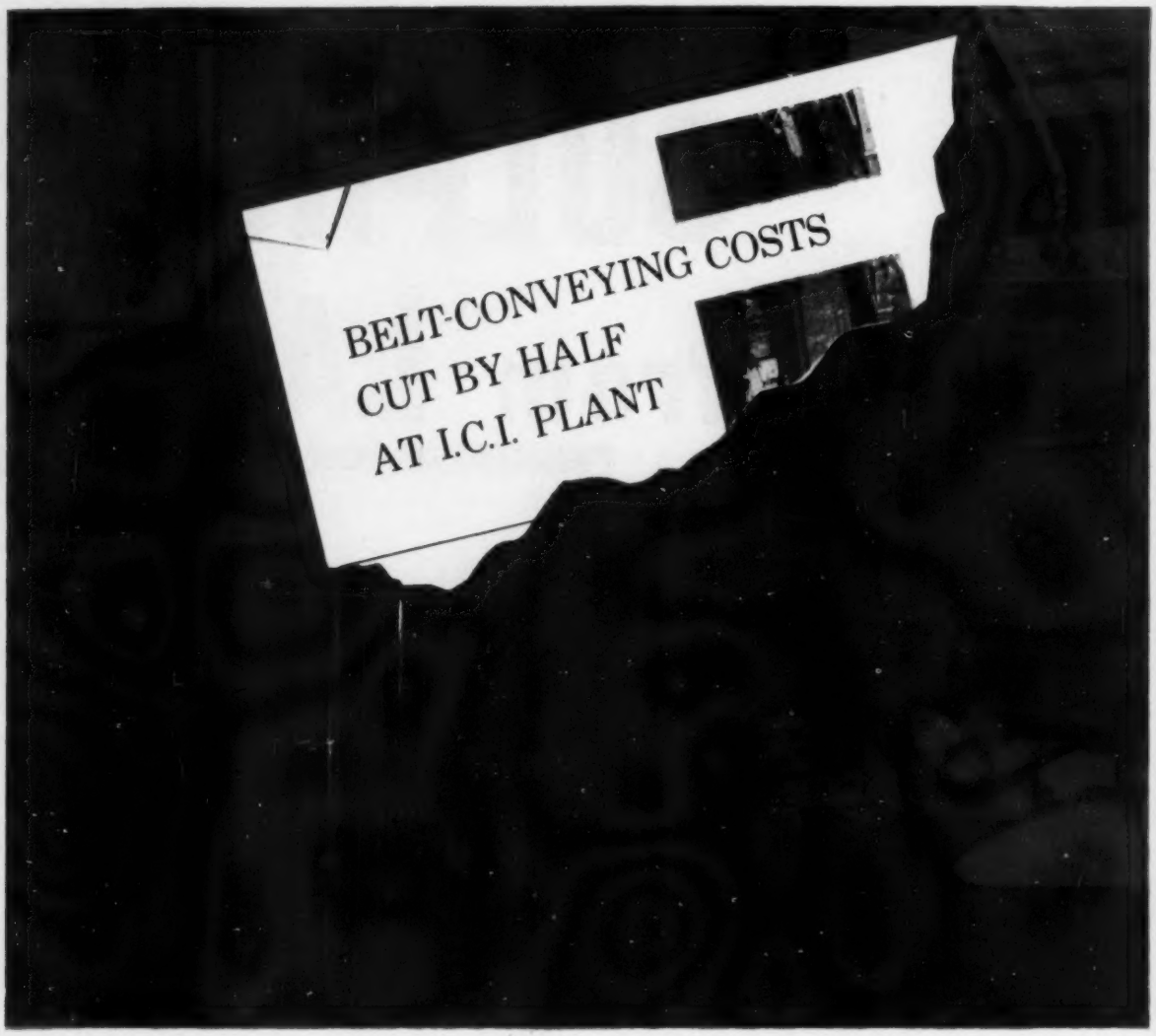

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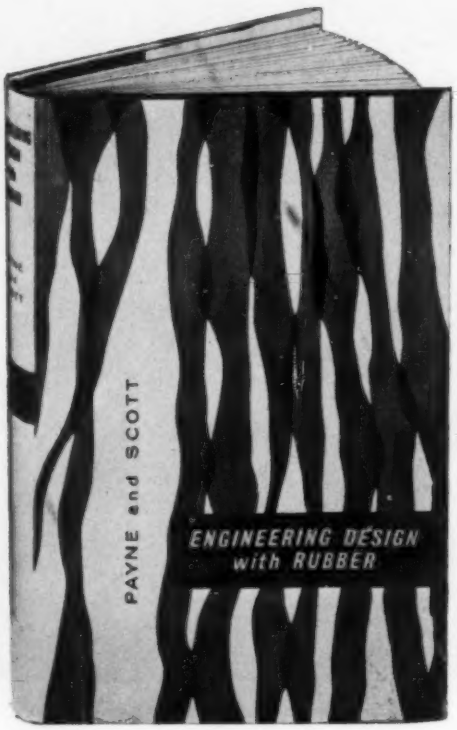
J. R. SCOTT, Ph.D., M.Sc., F.R.I.C., F.Inst.P., F.I.R.I.

R.A.B.R.M. MANUAL No. 4



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ring of a deuterium atom formed on rupture of a C—D bond under the action of radiation and the subsequent disproportionation of the cyclohexadienyl and primary radicals should, owing to the isotope effect, lead to transition of deuterium atoms from the aliphatic chain to the ring. The results obtained showed that the rate of these processes should exceed at least 5–6 fold the rate of the processes leading to cross-linkage.

It thus follows that the high radiation stability of polystyrene is to a considerable extent associated with disproportionation of the primary and cyclohexadienyl radicals.

Synthesis and polymerization of esterified polyacrylates was dealt with in a paper by T. Ya. Kefeli, G. V. Korolev and Yu. M. Filippovskaya.

The method of telomerization has been employed in the synthesis of the telomer homologs of polyacrylate esters with successively increasing degrees of polymerization (n) and of telomers differing in the nature of the polyester chain.

Compounds have been synthesized of the general formula

$$CH_2=C(CH_3)—COORO—[OCR_1COORO—]_n—OC—C(CH_3)=CH_2$$

where R and R_1 are alkyl or aryl radicals and $n=2$, 4, 8 and 20.

With change in (n) from 2 to 20 the structural viscosity of the polyacrylate esters increased from 150 to 8,000 centistokes (20°), the specific gravity from 1.213 to 1.308 and n_D^{20} from 1.515 to 1.5479.

The presence of double bonds in the molecules of the polyacrylate esters synthesized made it possible to carry out their polymerization (hardening) in the presence of radical chain initiators with the formation of glassy or elastic, insoluble, non-melting polymers of sufficient thermal stability and endowed with a number of valuable properties so as to be of considerable practical potentiality.

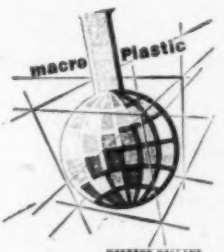
The changes in physical properties of the reaction system (gelation, gradual increase in density and finally the formation of a glass structure) in the course of the polymerization beginning from the very early stages (the gelation point is reached at 5–10% conversion) are responsible for a number of specificities in the kinetics of the hardening of polyacrylate esters. Owing to this a detailed investigation of the polymerization kinetics was made unde widely varying conditions. Polymerization in bulk takes place autocatalytically since with increasing degre of structuration in the course of polymerization the rate of diffusion of free radicals diminished, leading to a decrease in rate of chain termination. The rate of reaction begins to diminish markedly only at large extents of polymerization.

A study has been made of the effect of diluting the reaction mixture with an inert solvent, of the initiation rate, nature of the initiating agent, temperature, chemical structure of the initial polyacrylate ester, as well as of the addition of inhibiting agents on the polymerization kinetics. The results obtained have been discussed from the standpoint of the capacity of the system for structuration under the various conditions of reaction.

The heats of hardening of the polyacrylate esters with successively increasing distance between the terminal double bonds have been measured and their values have been discussed with respect to the reaction mechanism.

Velbex Pools

BX Plastic's Velbex — flexible vinyl sheet — is being used as a liner for back garden swimming pools. Several companies are carrying out the fabrication.



●A fully automatic injection moulding machine which will be shown by Peco at the MacroPlastic exhibition at Utrecht, October 19-26, will be their new 30MS30 Mk. II machine. This has shot capacities from 127/240g. and is equipped with the Peco Thermax high capacity plasticizing chamber.

●Brilliant Plastics N.V. are exhibiting a chair made from low pressure polythene elements which can be snapped into place on a tubular frame. The chair elements can be moulded on quite small machines, unlike earlier chair designs.

●James Halstead Ltd., manufacturers of Poly-Flor vinyl flooring are represented in the Julianahall. Poly-Flor is a very hard wearing flexible material which has good resistance to chemicals, does not support combustion and requires very little cleaning.

●N.V. Plastics Buitenpost, manufacturers of extruded products such as profiles, tubes and tapes, will exhibit a range of these and the machinery with which they are fabricated.

●Farbwerke Hoechst AG are manufacturers of a very wide range of plastics — acetates, vinyls, polyesters and olefinic materials — all of which will be shown. Another feature will be a symposium of topical plastics subjects — 'Hoechst talks shop' — in which plastics technicians and experts are invited to participate.

●Among the many boats on show will be the Dolfijn — a family outboard motor boat 10½ft. long and weighing less than 170lb., manufactured by Outboard-Boating, Drent-Knevel, Diemen.

RUSSIA IN THE MARKET

This week's sharp advance on the rubber market in Singapore has been attributed by some traders to speculation on the extent of Soviet Bloc purchases for September shipment.

At the moment, there is no active buying for the Eastern European countries but it is thought that much larger tonnages have been contracted for than originally supposed.

A leading Chinese dealer said the Soviet Bloc, excluding China, had bought about 35,000 tons, but these were past purchases, not new orders. He added that China was out of the market for the moment.

Go-slow at India

Nearly 900 of the 1,000 employees at the Inchinnan, Renfrewshire, factory of India Tyre and Rubber were not at work on September 6. This resulted from a go-slow movement which began the day before among vulcanizers following which the company laid off both giant and car tyre builders.

The dispute stems from complaints of lack of progress in negotiations on allowance payments for contingencies such as production hold-ups.

NEWS ABOUT MACROPLASTIC

SBAC Show at Farnborough

MANY NON-METAL APPLICATIONS

IN missiles and aircraft, both civil and military, the number of applications for rubber and plastics materials is rapidly increasing. Many of these, such as tyres, canopies and windows, are obvious, and of such long standing that they are almost forgotten despite their vital importance to the safety and reliability of every aircraft flying. There are, however, numerous much less apparent uses of man-made materials which are nevertheless of prime importance. Adhesives, for example, play a large part in the construction of the airframes of many modern aircraft. Redux and Hidux bonding systems and the more recently developed Aeroweb honeycomb core are already in use in over seventy different types of aircraft and are being put to extensive use in a number of new models under construction.

Epoxy and polyester resins used in conjunction with the several different forms of glass reinforcement are being used in applications such as radomes, internal bulkheads, ducting and racking. A development of the GRP field which is becoming established is the production of three dimensional woven or knitted shapes in glass cloth which may then be impregnated with a resin to produce quite complicated shapes cheaply and easily. Another development in this direction is that announced last year by Fothergill and Harvey who, in conjunction with Vickers Armstrong (Aircraft) Ltd., and Baxter, Woodhouse and Taylor Ltd., have produced panels moulded to follow the curve of the fuselage of the VC10. These form an air circulating duct which also acts as thermal insulation and sound proofing.

The English Electric Lightning was one of the aircraft on show at Farnborough. This view shows the retractable polyester glass-fibre rocket packs in the firing position just behind the nosewheel of the aircraft. Produced by Microcell Ltd., the launchers are an integral part of the fuselage

Natural and synthetic foams are playing an ever-increasing part in upholstery and in many of the cabins of airliners large areas of PVC fabrics are used as lining materials and as seat covers, latex is used as a backing for the carpets, and the traveller is, in effect, cocooned in plastics, eating off melamine crockery and drinking out of a polystyrene tumbler.

Returning to the more technical applications the electrical installations on all types of aircraft are becoming more and more complex, particularly in service planes such as the Sea Vixen which is filled with complicated electronic equipment. The need for miniaturization of this equipment has posed numerous problems for the designer whose requirements for materials with better electrical properties have been met largely by the use of various plastics. Also in this category is the provision of external de-icing equipment where delicate electric conductors must be protected against the elements.

Cables, oil-seals, gaskets, fuel tanks, jointing and sealing compounds, protective coatings and finishes, fittings, furnishings, parachutes and mountings, almost every facet of the rubber and plastics industries finds an application somewhere in the aircraft industry which is confirmed by the tremendous diversity of products displayed at the 21st SBAC exhibition.

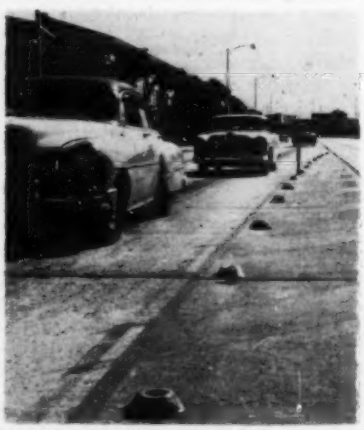
Additional Dixie Black

Anchor Chemical Company are now producing another grade of carbon black in the UK. This is Dixie 70 ISAF and it is stated, as a result of extensive tests, that this material will be readily interchangeable with other grades of ISAF black produced in this country. The current prices per lb. of the three grades of Dixie now available are as follows, in minimum 3-ton lots ex works Swansea: Dixie 45 GPF 6¼d., Dixie 60 HAF 7¾d., Dixie 70 ISAF 9¾d. In minimum 1-ton lots the corresponding prices are 7d., 8d. and 10d., and for supplies ex-warehouse in London, Manchester or Glasgow 7¾d., 8¾d. and 10¾d.

Polyglaze

A new company, Polyglaze, of Redhill, Surrey, has been formed to carry on business as the sole distributor in the UK of Polyglaze, which is imported from USA.

Directors of the company are: Mr F. Burdeus, Mr J. Cantavella and Mr S. Quartley, who is also general manager and who was formerly responsible for promoting sales of new plastics materials for Monsanto Chemicals.



Traffic markers in solving one problem often create yet another accident hazard — but not these chrome yellow rubber markers, spiked down in an American city. Goodyear Plioflex SBR was chosen, toughened with Plioite S-6E, a reinforcing resin

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VIEWS *and* REVIEWS

A STRIKING feature of the current technical Press, especially the German journals, is their interest in the application of plastics to building. Indeed, with characteristic German thoroughness, the first sentence of the first article in a special supplement to *Kunstoffe* for June 1960 says: 'The question is always being asked whether it is possible and reasonable to make a house entirely of plastics.' One would have thought that to attempt to do so would be to exhibit an unreasonable, unnecessary, and uncalled-for loyalty which might be described unkindly as a monomania and, indeed, the rest of that article and the remainder of the supplement goes on to describe the limitations of plastics for certain uses and to plead for an understanding of their properties before trying to put them to new uses.

Nevertheless, when all this has been said and understood, progress is often made by being unorthodox, by seeing a new material in an old setting. Anyone of a technical or progressive turn of mind who has recently considered buying or building a new house cannot fail to have been impressed by the general ignorance or torpidity of the average builder in the matter of newly available materials, articles, and methods.

Technologists, above all others, understand the importance of knowing the properties of new materials so that they can be fitted to new applications. We have to understand that the general public judges somewhat differently and we must face the fact that when plastics first became commercially available for retail sale, someone oversold them or debased them or both, with the result that we all became suspicious and stopped buying them. Only now is there a marked public acceptance of plastics again; they have had to creep back slowly into public favour. Few would doubt that one of the main factors has been the commercial availability of polythene, supported by the general realization that nylon and Terylene are also plastics.

Properties and Design

The relationship between the properties of a material and its design possibilities is an interesting and intricate matter. Which comes first? Which is hammer, which anvil? It is a theme which in various forms lies behind most development work. Does the designer define the characteristics he requires and then search for the material to give them, or, having the material, does he look around for uses for it?

In traditional industries, building and furnishing being two, another factor becomes important: art. Art, for its own sake, regardless. Buildings and chairs are designed primarily to look right rather than to serve their purposes.

A Minor Revolution

It is interesting to read Dr R. Banham's new book published by Architectural Press at 45s., *Theory and Design in the First Machine Age*. This period is the first thirty years of the present century, when the pace of technological advance quickened so much that new problems and circumstances were presented to architects, among others, and a minor architectural revolution occurred. Scholarly as the work is, it will disappoint the technologist by its attitude to the social impact of science, by the implicit assumption that the architecture of an era is determined not by the materials and accumulated skills available at the time but the conscious striving of the creative artist to symbolize in some way the spirit of the time.

Building Homes in a Factory

As might be expected, the information before me in journals and trade literature about the use of plastics in building takes a different line. In the *Kunstoffe* supplement, the second article ('Large Constructional Elements for Housebuilding from Plastics' by R. Doernach, pp. 355-6) starts from the other end. The demand for homes is now so great that the problem can be approached in the same way as the motor industry—mass techniques of finance, construction, and selling—involving careful planning of the production of unit parts in factories for assembly on the building sites. The plastics industry is eminently suitable and already largely organized to fit in with such an approach.

Plastics materials themselves, by their inherent properties, open up richer prospects than, say, the prefabricated, heavy elements of concrete whose limitations are now obvious, while the difficulties introduced into building even by the use of the conventional, standard brick have severely circumscribed the creative ingenuity of the architect. In an attempt to escape from the bondage imposed by the centuries-old 3in. x 4½in. x 9in. brick, the Building Research Station has just experimentally built two terrace houses on a module of 1½in., to fit this brick, and not on the 4in. module of the Paddington flats designed by Sir William Holford. Commenting on this, the *Architects' Journal* says:

'There is little doubt that traditional building can be cheapened by the kind of co-ordination of sizes and of building dimensions practised in this study though it seems doubtful whether the margin of possible saving is great.'

If this be true, then the use for the basic building elements of plastics, which have no inherent size limitations to give rise to such restrictions or to the modular half-escape from them, is surely a fertile field for study.

Of course, the use of plastics in building will give rise to bizarre designs, indeed this is a measure of its design potentialities. The *Kunstoffe* building supplement illustrates this well. To English eyes, the Italian plastics-built home (p. 353) and the German, Troisdorfer bungalow (p. 360) are refreshingly new in design without being startling, but we should need time and goodwill to accept the shell-quadrant construction (p. 356) and still more the spherical Kugelhaus (p. 359).

The Basic Elements

In these buildings, plastics of one sort or another provide the basic building elements — the load-bearers, the walls, floors, ceilings, roofs. A laminated sandwich is a common form, having an interior of a cellular material made either in honeycomb fashion from paper or in sponge form from a rigid foam such as polystyrene

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **F. C. JENNINGS**

or polyurethane. The outer layers of the sandwich may be metal, plywood, plastics with or without fabric or glass fibre reinforcement, etc. The plastics materials and the forms in which they are suitable for building are reviewed in some detail by Dr Georg Schulz in the supplement pp. 357-9.

The issue also has a description of a window frame made cheaply by a casting process from polyester reinforced with glass-fibre. A tabulated list of properties in comparison with steel and aluminium will be useful to the technically minded architect; it shows how resistant the material is to compression, tension, impact, and bending forces. A more technical paper dealing with glass-fibre-reinforced plastics is to be found in another part of the issue and although it is mainly concerned with highly stressed constructional elements it is valuable for static-load-bearing problems also. This paper is followed by one which could be paralleled in many another journal; it deals with the making of connexions or joints in polythene pipes. Pipes are an obvious use for plastics because they are resistant to a variety of corrosive agents; now they have passed the stage of proving trials one is more concerned with installation and especially on-the-spot work such as jointing and fitting.

The paper by Richard, Gaube, and Diedrich describes in detail a variety of methods of joining pipes made of Ziegler polythene. Starting from the proposition that joints must be tight, reliable, long lasting, and easy and quick to make, the authors examine first butt welding, then the several types of 'mechanically' held joints such as clips, flanges, screw-couplings, and so on.

Sandwiches in Boat Building

Glass-fibre reinforced polyester resin is finding an increasing application in boat building because of its low weight, high strength, and chemical inertness. Its properties are further improved by using it as the outer layers of a sandwich having a low-density interior such as a foamed plastic or a honeycomb made from paper. A well-illustrated article on pp. 331-4 claims that foams of polystyrene or polyurethane leave much to be desired: polyurethane foam is said to be insufficiently resistant to shearing forces and to moisture over a period and to have a low resistance to impact; polystyrene foam is said to be insufficiently resistant to compressive forces and has a poor adhesion to the polyester outer sheet; foam rubber is said to tend to become brittle on ageing and to grow mould in fresh water. In preference to these, a cellular, unplasticized PVC is recommended and the rest of the article is concerned with the physical properties and especially the resistance to impact of various sandwiches of expanded PVC faced with polyester/glass-fibre.

In this issue of *Kunstoffe* there are altogether nine papers or articles more-or-less directly connected with the use of plastics in building. To them should be added a well-illustrated article by Dr F. Stastny on pp. 317-322 of the July 1960 issue of *Kunstoff-Rundschau*, dealing with the cellular polystyrene Styropor, used as the interior of sandwich, building elements and faced with paper, concrete, ceramic tiles, and so on. Photographs are reproduced of bungalows, a five-storey block of flats, and other tall buildings using this type of sandwich for inner and outer walls. The same journal on pp. 323-5 has a paper by H. Baumann on the flame resistance of Isoschaum, a cellular formaldehyde resin. The test is to soak the resin in petroleum ether and set fire to it.

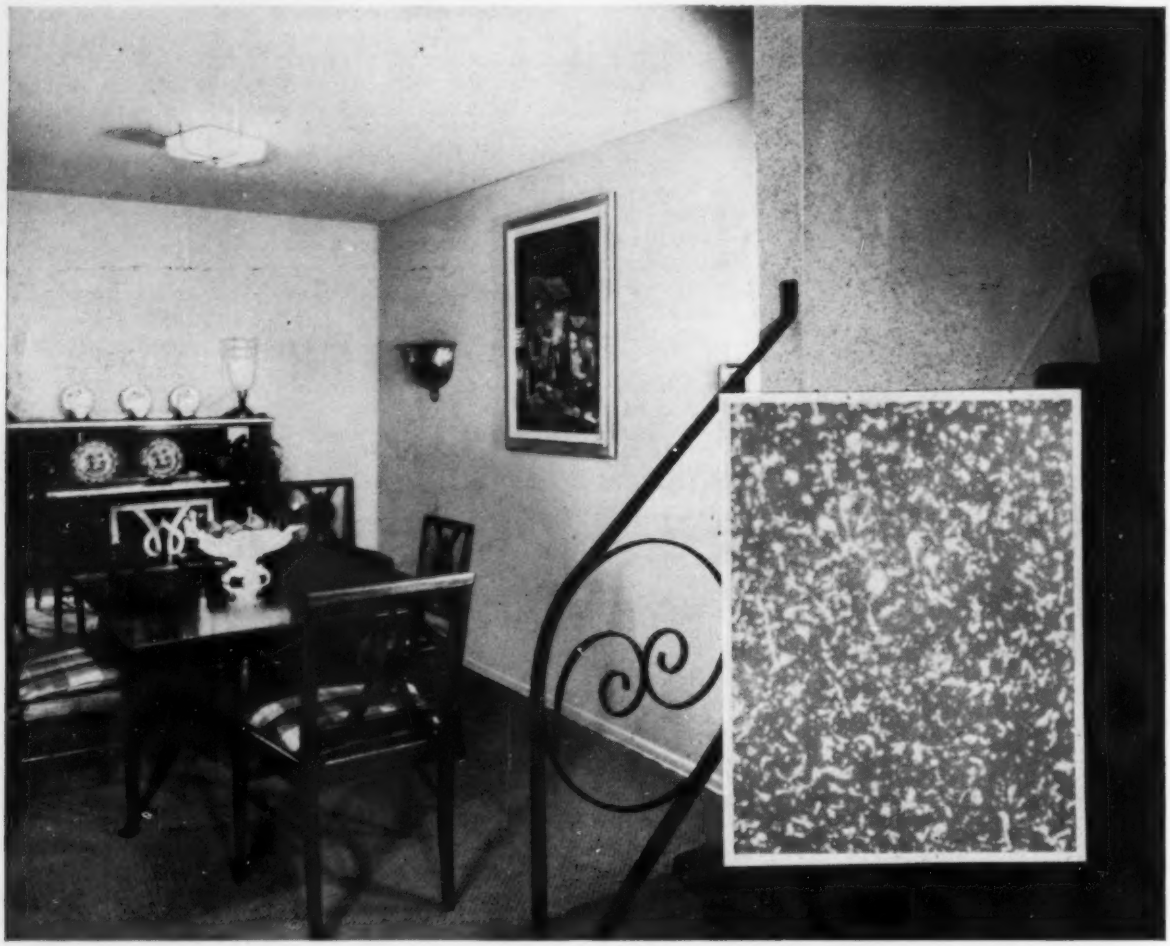
'Thermal Resistance'

Appropriately enough, to round off this review of plastics in building there comes to hand a pamphlet from the Marley Tile Company called 'Thermoplastic Tiles on Floor Heating Systems' by F. L. Brady. The increasing use of underfloor heating systems has introduced new hazards in flooring and especially brought into prominence a property which the pamphlet calls 'thermal resistance'—meaning the opposite of conductivity. A list shows that thermoplastic tiles offer less resistance to the flow of heat than do marble, clay, linoleum, timber, or cork, all calculated to their characteristic thicknesses as flooring materials. To the request for assurance that tiles will not soften over floor heating, the author first offers the sensible qualifications which are apparent to the technical mind and then describes a practical experiment covering a space of over six years during which, although there was nothing approaching a condition of embrittlement, the resistance to indentation actually increased. The pamphlet is of interest as illustrating a commonsense approach to intricate technical problems.

CHARLES JENNINGS

Hot and Cold Compounding

The effect of high temperatures during the mixing of carbon black compounds is discussed in a paper which appeared in the German journal *Kautschuk und Gummi* in July. This gives a detailed account of the physical properties and the bound-rubber contents of carbon-black-loaded compounds made under 'cold' and under 'hot' Banbury mixing conditions from a variety of rubbers including natural, SBR cold and hot polymerized, NBR, and butyl rubber. The blacks used in the investigation were FEF, HAF, ISAF and SAF, and their effects on the properties investigated were found to change in that order, which is the order of increasing surface area. The bound-rubber content increased linearly with the specific surface area, and at each mixing stage the bound rubber content decreased during cold mixing but increased during hot mixing. The physical properties measured included Mooney viscosity, Defo hardness (which increased linearly with bound-rubber content in all types of rubber), tear strength (notably improved by hot mixing in SBR cold-polymerized), tensile modulus, resilience, fatigue properties with the de Mattia machine, and static and dynamic elastic moduli. No unfavourable effects of hot mixing on the properties of natural rubber vulcanizates were observed; results on the synthetic rubbers were various. Accelerator systems were studied in a similar way, one conclusion reached being in favour of the conventional method of adding sulphur and accelerator on a roll mill after Banbury mixing. Finally there is a brief discussion of the effects of so-called 'promotors' on the behaviour of butyl rubber.



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MEN *and* MATTERS

A Review of People and Events

by Peter Richards

ONE of the most popular figures in the tyre world, W. A. Hazlett, who for 17 years was managing director of Goodyear (UK), died in Akron, Ohio, on August 29. He was 73. A native of Deersville, Ohio, Mr Hazlett joined Goodyear in Akron in 1906 as a stenographer and shortly afterwards became an audit clerk. After a number of years with the organization's sales departments he went to Los Angeles as vice-president of Goodyear-California in 1924.

He came to the UK as managing director of the British company in 1937. He made many friends here, and returned to Akron in 1955 as vice-president of the Goodyear parent company, working on special assignments.

Mr Hazlett retired three years ago. He leaves a widow, one son and one daughter.

Unification

Before the war I.C.I. was almost unknown to the general public. Their massive prestige advertising campaign remedied this so that by now there must be scarcely anyone in the country who is ignorant of the name. Now Dunlop, as reported last week, have launched a similar institutional advertising campaign. They are dealing with a different problem. The name is known and the object, the company says, is to 'unify and identify Dunlop and its products throughout the world.'

They are doing this with a new symbol — very well designed — which forms the centrepiece of the advertising. Most people have probably seen examples of this by now: big spaces have been used in the national Press.

I was impressed by the idea, but not by the treatment. The advertisement series features six aspects of Dunlop's work: research, raw materials, employment, production, distribution and sales. Employees were spotlighted in the advertisement I saw: they were framed in an enlarged version of the symbol with facts about the other aspects splayed from it. The result was rather dull and diffuse. Even the employees marching to work — you could tell it was to work — seemed to feel it.

Cabot Changes

Iain B. Horn has been made assistant technical manager at Cabot Carbon's plant at Stanlow, Ellesmere Port, Cheshire.

Mr Horn (*left*), a graduate from Glasgow University, was previously laboratory manager at the India Tyre and Rubber Company factory at Inchinnan, covering laboratory operation and tyre development.

At Stanlow he will assist the technical manager in maintaining technical contact with customers and supplying technical service throughout the UK.

Mr N. Scott, who previously held the position of senior chemist at Stanlow, has been appointed laboratory manager. His responsibilities will cover the administration and organization of the laboratory. In addition he will handle special blacks applications covering a number of fields, including that of general pigmentation.

Oligos and All That

Whatever you feel about nationalization, you must agree that nationalization of terminology is a good thing. The polythene polyethylene argument is still unresolved; and every day dozens of typists up and down the country must say plaintively: 'Is polyolefin with an "e" or without?'

Soon they may be asking the question: 'Is it an oligomer or a polymer?' if the Texas-US Chemical Co. has its way.

Texas-US suggests that this nomenclature should be used for low molecular weight compounds built up from 2, 3 or 4 monomer units. An example given is 4-vinyl-1-cyclohexane, a dimer prepared by Diels-Alder con-

The new Butlin's resort at Bognor Regis has an unusual type of suspended ceiling. 150 gauge Fablon polythene film is stretched taut across wooden battens. Printed pvc—carnival design—is laid on top of the polythene and daylight from deadlights in the roof 'glows' through both layers of plastic

densation of butadiene. The term is derived from the Greek *oligos*, meaning small or few.

Personally I think we could do with as oligos of these terms as possible.

European Director

Dr John D. Kendall has been made director of European research laboratories of the Minnesota Mining and Manufacturing Co.

Dr Kendall was for many years responsible for the direction of organic chemical research at Ilford Ltd. In his newly-created post with 3M Company — manufacturers of Scotch Boy adhesive and recording tapes — he will be responsible for setting up a European research operation for the firm. The first assignment for the new laboratory organization, I understand, will be the development of 'new graphic products.'

While Dr Kendall will have offices originally in London, a permanent location for the new laboratory has not yet been selected. It may be either in England or on the Continent. Dr Kendall will work under Dr Carl E. Barnes, 3M Co.'s vice-president for research who is located at the firm's headquarters in St. Paul.

Mr J. F. L. Ludgate (left) has been made assistant sales manager of Tufnol Ltd. After service as chief designer of Sessions Marine Ltd., Mr Ludgate joined Tufnol in 1955 as sales engineer in the London area. Another sales appointment is Mr J. W. Woolley to northern area branch manager. He has been with Tufnol since 1946

Picking Patterns

A lot of newspaper competitions, with a wonderful lack of originality, ask the reader to: 'fill in the panels in your order of preference and say why you like blank in not more than twenty words.' Kudos to Formica, who have broken out of the rut.

As part of their Formica Fortnight, which starts at the beginning of October, a nation-wide 'Heavenly Home' contest is being held. A plan of three rooms is given, together with 15 new Formica decorative laminate patterns. The idea is to use the patterns effectively in the rooms: this demands colour sense and a considerable feeling for interior decoration.

The judges will be Lady Barnett, John Blake (Editor of *Design*), Gerard Riddick (chairman of Formica) and Robert Walber (design manager, Formica).

That Extra Inch

471 latex foam mattresses went to sea last month when the *Windsor Castle* left on her maiden voyage. The mattresses have been supplied for the crew by Vitafoam.

Rank will, however, be preserved: officers' quarters will have 6in. deep mattresses and the crew will have 5in.

* * *

James R. Pendry has been appointed general sales manager of Rubber Corporation of America, manufacturer of chemical and plastic products. Rubber Corporation, with executive offices and manufacturing facilities in Hicksville, was founded in 1930. In February this year control of the company was acquired by a Swiss Group, led by Oerlikon-Buehrle, who in turn have strong interest in Dynamit-Nobel A.G. of Troisdorf, West Germany.

* * *

Dr Max E. Roha is the new manager of plastics research at the B. F. Goodrich Co. Research Centre, Brecksville, Ohio. Dr Roha joined B. F. Goodrich in 1949 from Harvard, to work on new products and uses of beta-propiolactone. He has been responsible for research in catalysis of polymerization.

* * *

Douglas Talbot has been made manager of Akron public relations for the Firestone Tire and Rubber Co.

* * *

Russell E. Montgomery, who has been with B. F. Goodrich for 31 years, has been elected managing director of B. F. Goodrich Australia Pty. Ltd. The company's Australian subsidiary plant in Melbourne was completed and began production early this year.

Question Corner — 134

(Second Series)

459. What is the difference between the melting point and the heat softening point of polythene?

(Answer next week)

Answer to Question Corner — 133

458. There are a few tests that can be used for measuring the slip properties of plastic film. One is a method which uses 'the inclined plane tester.'

This is, essentially, a pivotable plane on which a metal block will slide when the moveable end is raised to a certain angle. The block is covered on the bottom with sponge rubber. A specimen of the film to be tested is wrapped tightly round the block and this is placed on the inclined plane. The angle is slowly increased until the block slides uniformly down the plane.

The tangent of this sliding angle is the coefficient of friction of the test piece.

Another test uses the horizontal plane tester in which a similar metal block with a sponge base is used. The test piece is wrapped round the block and made to move on a horizontal plane. The block is put in motion by a pulling force applied to it at a constant rate by a tensile test machine. This force is divided by the weight of the block, in grams, and represents the coefficient of friction.

The inclined plane tester may also be used to measure the degree of blocking of a film: the force in grams required to slide one film over another in a parallel direction is measured.

(Another question next week)

Polly Ester Says . . .

'Brownian Movement — first step to the Girl Guides'

1. N. G. Welding (London). 2. J. M. Buist (Manchester). 3. F. Turner (South Wales). 4. R. P. Yates (Scotland). 5. E. Smith (North Eastern). 6. C. H. Leigh-Dugmore (Midlands). 7. D. M. Turner (Western). 8. R. I. Wood (Merseyside). 9. W. H. Swire (Leicester). 10. G. H. Pearson (Preston)

IRI Chairmen for 1960/61

NEW chairmen of the sections of the Institution of the Rubber Industry were recently elected at meetings which were held throughout the country. Brief biographies of the chairmen are given below.

N. G. Welding *London*

N. G. Welding graduated in chemistry and physics at Cambridge and London in 1941. In the rubber service department of I.C.I., Dyestuffs Division, he was concerned with the blending and testing of Vulcaprene synthetic rubber, and later with physical test development and control.

On joining the National College of Rubber Technology in 1946 he developed courses on physical testing of polymers and statistical analysis of results. More recently he has specialized in polymerization theory and the relation between the structure and properties of polymers.

He was appointed Reader in Polymer Science in May 1957.

He has been a member of the IRI Council since 1955, was secretary of the London section from 1957-59 and vice-chairman from 1958-60.

J. M. Buist *Manchester*

Educated at St. Andrew's University, J. M. Buist joined I.C.I. in 1940. In 1951 he was appointed assistant manager in the rubber service department.

On August 1 1958 he was appointed assistant manager in the polymer and chemicals service department and is the head of the urethane polymers group in that department.

Mr Buist has published more than 50 original papers and has several patents to his credit. In 1945 he joined the British Standards Committee, working on the revised edition of BS 903. At present he is chairman of the committees responsible for the mechanical testing section of BS 903 and of RUC-1 which coordinates the work for international standardization carried out by Committee ISO/TC/45. He was chairman of the ISO/TC/45 Conference held in Zurich in 1957. He is the author of the IRI monograph on 'Ageing and Weathering of Rubber' and delivered the 12th Foundation Lecture to the IRI in 1957.

F. Turner *South Wales*

At present production manager of Semtex at Brynmawr, Mr Turner has spent thirty-six years in the industry — all on the production side. After four years with Redfern's Rubber Works Ltd. and four with BTR at Burton-on-Trent — where he lectured on rubber technology at the local technical college — he joined Dunlop in 1932.

His last six years at Brynmawr have, he says, been a most interesting development period, during which the factory has been established for the manufacture of flooring of all types.

He has been a member of the IRI from its early years and a member of the South Wales committee for the last two years. Formerly an enthusiastic Rugby player, his main hobby now is motoring.

R. P. Yates *Scottish*

In 1927, when he was only 17 years old, the new chairman of the Scottish section branched out on his own as a chemical distributor. He first acted for J. M. Huber Ltd., and in 1934 became Scottish agent for Hubron Rubber Chemicals. He still acts for this company, and is also agent for the Cornbrook Chemical Co. Ltd., and for the Union Oxide and Chemical Co. Ltd.

He has wide interests outside the industry: he entered local government over five years ago and is a county councillor on Lanarkshire County Council. Eventually he hopes to enter Parliament. He has represented his county at golf and Scotland at bridge.

E. Smith *North Eastern*

After early years as a works chemist in the metallurgical field, Ernest Smith took an appointment with a firm of consulting analysts in 1921, remaining with them until 1939, when he was transferred to the Royal Ordnance Factory at Birtley, taking the position of chief chemist.

After the war he became works manager at Felling Zinc Oxide Co. Ltd., being appointed to the board in

1947. He became managing director in 1958.

He became associated with the north-eastern section of the IRI when it was formed in 1951, has been on the committee and is a previous vice-chairman.

C. H. Leigh-Dugmore *Midland*

C. H. Leigh-Dugmore joined the tyre technical department at Fort Dunlop in 1937 and, except during the war, worked there until 1949. He then moved to the Dunlop Research Centre where he now manages the basic compounding research section. He has written an IRI monograph on *Microscopy of Rubber* which is expected to be published this year.

He is a Fellow of the Royal Statistical Society of whose Birmingham Group he is also chairman.

In 1939 he was mobilized with the Territorial Army and, after serving with the Royal Warwickshires and the Sherwood Foresters, was demobilized as a captain in 1946. He is married and has a son and daughter. His other interests are golf and motoring.

D. M. Turner *Western*

D. M. Turner joined the research department of the Avon Rubber in August 1952. In 1955 he switched to car and motor cycle development and is now tyre development manager.

He presented a paper on wave phenomena in tyres at high speed at the third Rubber Technology Conference in 1954 and has been author of various papers with D. C. Hartley on racing tyre design, with T. J. P. Joy and D. C. Hartley on tyres for high performance cars, and with A. Schallamach on the wear of slipping wheels.

Mr Turner has found the tyre industry to be full of variety with visits to car race tracks in Florida, scooter factories in Italy, tyre factories in Germany and bus depots in Glasgow.

Married last year, he enjoys good food and tennis.

R. I. Wood *Merseyside*

R. I. Wood, who is technical manager of Cabot Carbon Ltd., has been associated with the rubber industry since 1946. He joined the staff of the then British Rubber Producers Research Association in 1948 and worked for the association at the Rubber Research Institute in Malaya from 1950 to 1952 in connexion with the scheme for the technical classification of natural rubber. He was appointed senior technologist at BRPRA in 1953.

He joined Cabot Carbon as chief chemist in 1956.

He served as a pilot in the RAF in World War I, is married, and has twin boys aged seven. His hobbies are astronomy and telescope making.

W. H. Swire *Leicester*

A Lancashire man, W. H. Swire spent most of his early life in Leyland, one of the historical seats of the British rubber industry. He was brought up in the industry under the wing of Wilfred Bowden in the laboratories of British Tyre and Rubber.

He joined B.B. Chemical in May 1939 to take charge of the rubber research and development laboratory. In 1947 he was made general research manager for the company, and a director in 1957.

G. H. Pearson *Preston*

The new chairman of the Preston section joined the then Wood Milne Co. in 1917. He started as a trainee at 5s. a week, and survived all the transformations that led to BTR's present shape and substance. He is now works manager at Leyland.

His career has taken him successively through work study, tyre production and factory management.

Mr W. V. S. Sinclair has reassumed chairmanship of the Anglo-Sumatra Rubber Company in place of Mr J. L. Burden, who remains on the board.

Easy Breathing at 300°F.

Moulded polyurethane foam forms an integral part of a new industrial respirator, which allows plant personnel to breathe safely and comfortably in temperatures up to 300°F. Using the new cartridge and protective clothing, wearers can work in safety and comfort for periods up to half an hour, without the need for bulky air hoses or portable tanks.

Because extensive cooling-off is no longer necessary before maintenance can begin, the respirator has much reduced down-time of furnaces, ovens, and kilns which must be periodically inspected or repaired.

Essentially, the device is a heat exchanger consisting of layers of metallic screen contained in an Allied Chemical polyurethane foam insulating shell. It is designed to function satisfactorily even when air intake is above normal — as in cases where much bodily energy is being expended.

The shell is moulded in the shape of a cylinder, 3in. od with walls ½in. thick. Sixty-five layers of regular aluminum screening are fitted into the semi-rigid foam shell, which insulates them from high ambient temperatures. The screens are locked in place by a perforated outer plate. The entire cartridge is 3in. long, and weighs only 6oz., including a face piece of soft moulded rubber. The complete respirator may be attached to a special aluminized asbestos hood, used for very high temperatures.

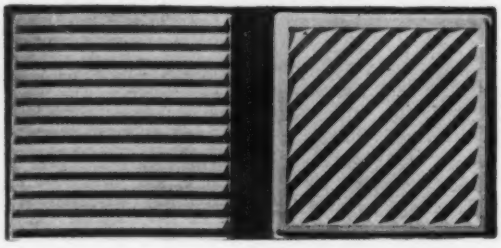
Acting as heat exchanger, the respirator cools air to a comfortable temperature before delivering it to the user. As the wearer inhales, hot air is forced through the layers of metal screen, which absorb and store much of the heat. Exhaling through the respirator in the opposite direction strips heat from the screens and cools the cartridge for the next cycle.

Equilibrium conditions are soon established, so that the temperature of the inhaled air remains constant at approximately 100°F.

Ceylon Duty

A joint memorandum submitted to the Finance Minister of Ceylon urges that a sliding scale of duties on rubber be substituted for the present fixed rate.

The memorandum suggests a system under which no duty will be payable when the cif price is less than 92 cents a lb. When the price is above 92 cents, the duty would rise cent by cent from 93 to 97 and when above 97 cents the duty would rise by one cent for every three cents in the rubber price.



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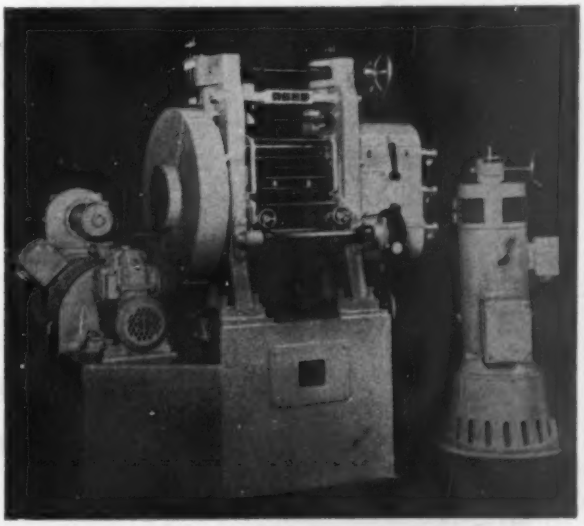

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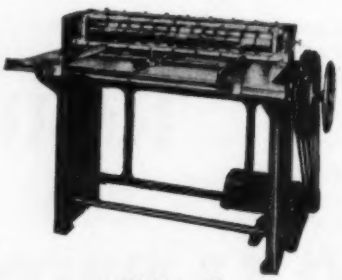

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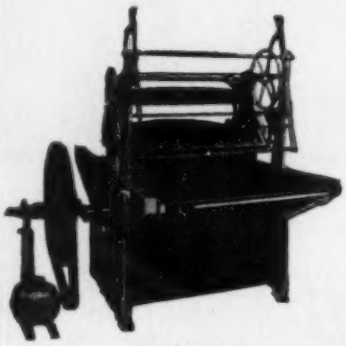

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Plantation Commentary

BUGBEE SOUNDS WARNING NOTE TO NR PRODUCERS

by our Malayan Correspondent

FROM KUALA LUMPUR

BACK in Malaya after an absence of eight years, Mr H. C. Bugbee, president of the Natural Rubber Bureau in the United States, said here that natural rubber producers must be prepared to sell profitably for less when competition with more and better synthetics made it necessary.

For three weeks Mr Bugbee moved about Malaya talking to rubber producers and Government officials, scientists and packers, and generally seeing for himself the new developments in the industry here.

Sounding a warning on the current high price of rubber, he said they must be realists. 'While enjoying the benefits that high prices bring, we must realize that such prices spur synthetic manufacturers to increase research and enlarge production facilities,' he said.

Synthetic was a competitor and a strong one. In the United States synthetic now had about 68% of the market.

'Despite this, USA is the world's best consumer for natural. Last year USA used more than 555,000 tons of natural rubber and bought more of its natural rubber from Malaya than from any other source,' he said.

Rising World Demand

He pointed out that from a percentage standpoint, synthetic in the years ahead would go consistently higher because natural could not increase production sufficiently to meet continuously rising world demand for rubber.

But while synthetic percentages would increase, natural would sell all it could produce, forecast Mr Bugbee. By 1965 production should reach about 2,235,000 tons, and by then the producers of natural rubber expected to sell this amount.

'The natural rubber industry in Malaya appears healthier today than it has been at any point during the past decade,' he said. 'Thanks to the aggressive replanting and research we are now carrying on, and the constantly growing world demand, the possibilities for natural during the next decade look bright indeed.'

Natural's ability to compete with synthetic in the years ahead lay in its success in profitably meeting whatever price the competition required, Mr Bugbee went on.

Current replanting, and new planting with stocks that produced three and four times today's average yields, was the key factor in making this possible.

'Replanting, together with the expanded research and development now being carried on all over the world under the direction of Sir Geoffrey Clay and the Malayan Rubber Board, are the basics upon which rests natural's future.'

PA-80, the latest in the range of superior processed rubber from Malaya's Rubber Research Institute, was arousing 'quite a fair amount of interest' in USA. Many sample tests had now been carried out by manufacturers, and requests for ton lots, to carry out pilot schemes, were now coming through.

Turning to a new material was a very slow business, he continued. In the case of SP rubbers it took from two to three years before they were used in any sizeable quantities.

Malaya's Minister of Finance, Mr Tan Siew Sin, has also spoken here about the bright future for natural rubber.

Mr Tan said that in 1957 the United States consumed 21lb. of rubber per head; followed by the United Kingdom with 11lb.; Australia, Canada, France and Germany averaged between 8 and 12lb.; Russia less than 1lb.; and Communist China less than ½lb.

The world as a whole, continued Mr Tan, consumed about 2½lb. of rubber per head a year. If the world continued to use rubber at the present rate, there was bound to be a growing demand in the next 10 years.

He said the reason for the demand of synthetic rubber was that there was not enough natural rubber. Large American rubber manufacturers had started planting rubber in Africa.

'If natural rubber had no future, we should not find Americans opening up rubber plantations there,' he added.

Mr Tan said that in Malaya's rural development programme accent would be placed mainly on rubber which was a solution to the unemployment problem.

Study Group Conference

Malaya's popular Prime Minister, jovial Tengku (Prince) Abdul Rahman, will open the International Rubber Study Group conference here on September 19. It will be one of the biggest international conferences ever held in Malaya with representatives present from 22 countries and five international organizations.

The conference will last until September 26 when a six-day rubber research conference, organized by the Rubber Research Institute, will follow.

Representatives are expected from Australia, Austria, America, Britain, Burma, Belgium, Ceylon, Cambodia, Canada, Czechoslovakia, Denmark, France, Germany, Hungary, Italy, Indonesia, Japan, Liberia, Netherlands, Siam and South Vietnam in addition to Malaya.

The preparatory committee, which was appointed in February to deal with the organization and efficient running of the conference, has now recruited bilingual translators and typists in addition to the usual pool of stenographers to man the conference secretariat.

The second conference on natural rubber research will be opened by the Minister of Commerce and Industry, Mr Mohamed Khir Johari.

This conference is designed to bring together research workers and technologists from natural rubber producing and consuming countries; it will also give participants opportunity to meet representatives from Malayan rubber circles.

Research institutes in all the major producing countries, research organizations of private concerns, and institutes concerned with natural rubber in consuming countries have been invited to contribute papers. So far 80 have been offered.

The provisional grouping of the papers for the two concurrent sessions is:

Research into natural rubber production — nutrition; ground covers and weed control; ecology and environment; breeding and selection; vegetative propagation; tapping and yield stimulation; and pests and diseases.

Research on the preparation and use of natural rubber and latex — biochemistry of latex; microbiology of latex; chemistry and technology of dry rubber; chemistry and technology of latex; factory practice and allied subjects.

In addition to these two sessions, there will be three general sessions addressed by guest speakers. These will include a paper on 'New Methods of Elastomer Synthesis and Their Impact on Natural Rubber' by Professor Geoffrey Gee of the University of Manchester.

Loose Talk

One of Malaya's top British civil servants, Mr I. D. Irvine, permanent secretary to the Ministry of Commerce and Industry in Kuala Lumpur, spoke here on the eve of his retirement about the proposed rubber exchange for the Federation.

He said there had been a lot of 'loose talk' about it, and a great deal of inaccurate guessing.

The Federation of Malaya was only

aiming at what she could justly claim by virtue of the fact that she was the number one producer of natural rubber in the world — namely, a bigger active stake in the marketing of her product, said Mr Irvine.

There were two distinct aspects to the marketing of rubber. One was the spot or cash market, which incidentally was not entirely confined to dealing in physical rubber, and the other was the futures or exchange market.

'The two are quite distinct. Both are at present carried on very efficiently in Singapore, and it is the Federation's intention that the marketing operations shall also be pursued in the Federation, with the added safeguard that contracts will have the force of the country's law behind them,' he added.

However, Mr Irvine said, it was the Federation's intention not to commit herself to a precise line of action until she had obtained the best advice. 'It is this expert advice for which it is at present negotiating,' he said.

Appointment Deferred

The newly-appointed Director of the Rubber Research Institute, Dr C. C. Webster, may not take up his appointment until December. Dr Webster, who succeeds Mr C. E. T. Mann, was offered the appointment in April.

He recently accepted the post but is at present committed under contract to the Imperial College for Tropical Agriculture in Trinidad where he is the Principal.

Dr Webster is now expected to come to Malaya in December or early January. Meanwhile the former deputy director, Mr C. G. Akhurst, is acting as director.

Welsh College Course

A course of lectures on the chemistry of some plastic materials is to be held at the Welsh College of Advanced Technology. On Thursday October 13 the lectures will be: 'Polymers: Natural, Regenerated and Synthetic' (B. Ellis, Senior Lecturer, Welsh College of Advanced Technology); 'Phenolic Resins' (A. A. K. Whitehouse, Chief Chemist, Ferodo); and 'Epoxy Resins' (R. F. Webb, Director of Research, Ciba).

On Thursday November 3 the programme is: 'Polyamides' (A. Hill, I.C.I.); 'Polytetrafluorethylene' (D. A. Smith, National College of Rubber Technology); and 'Polyethylene and Polypropylene' (M. N. Berger, Shell).

The programme on November 24 will be: 'Polyurethanes' (F. C. Chapman, I.C.I.); 'Raw Materials for the Plastics Industry' (M. Kaufman, National College of Rubber Technology); and 'Inorganic Polymers' (M. F. Lappet, Manchester College of Science and Technology).

Rubber Statistics

UNITED KINGDOM — THAILAND

TOTAL consumption of rubber in the first half of this year in the UK was 145,415 tons. 90,581 tons of this were natural and 54,834 tons synthetic. This position is shown in the latest figures published by the Secretariat of the International Rubber Study Group. The consumption figure included 13,930 tons of latex (of which 2,016 tons were synthetic latices).

During the six month period 40,786 tons of synthetic were produced and 102,682 tons of natural imported (85,914 tons crude and 16,768 tons latex). 33,730 tons of synthetic were imported.

Stockpile releases totted up to 35,753 tons. The stocks at the end of the period were 43,283 tons — an increase of 11,904 tons over the January 1 figure (these amounts do not include Government stocks).

23,643 tons of reclaim were produced and 19,073 used; 5,618 tons were exported. 9,352 tons of synthetic were exported in the six months and 26,932 tons of natural were re-exported.

Thailand

Thailand exported 11,372,320 kilos of rubber of all grades in June, compared with 14,410,927 kilos in May, according to trade estimates.

Destinations included (quantities in kilos):

	June 1960	June 1959
US	4,622,239	2,810,527
Japan	2,585,005	1,144,993
West Germany ..	1,488,776	182,891
Singapore ..	836,799	420,257
Malaya	646,130	106,183
Czechoslovakia ..	609,635	—
Soviet Union ..	406,426	—
Netherlands ..	40,824	—
Hong Kong ..	39,123	28,803
Australia	35,721	—
UK	25,400	218,635

GSA Sales

The General Services Administration announced on September 2 that sales of crude natural rubber from the US Stockpile during August totalled 5,167 long tons.

Approximately 86,747 long tons have been sold during the period October 16 1959—when sales started —to August 31 1960. July sales totalled 8,271 tons and June sales 5,583 tons.

Companies in the News

Monsanto

Net sales of Monsanto Chemicals rose from £8,726,720 to £10,373,651 in the half-year to June 30 1960, compared with the corresponding 1959 period. Net income, after estimated taxes, increased from £371,611 to £651,228.

The substantial increase is due, the statement to shareholders says, in some measure to the new polythene plant at Fawley having come into full operation. During the first half of last year it was just coming on-stream and, as reported, made no significant contribution to sales, while its development expenses were charged against profit.

Net sales for the full year 1959 were £18,427,505 and net income £1,336,424. Income included gross dividends received of £393,780 — no such dividends are included in the half-yearly figures.

Firestone

Firestone Tire and Rubber Company of Akron will report record earnings and sales for the nine months ended July 31, exceeding the previous peaks set in the period last year, according to Mr Raymond C. Firestone, the company's president.

In the first nine months of the 1959 fiscal year, sales came to $846,453,946.

The company was affected by the intervention of the Cuban authorities at its tyre plant near Havana. It is not yet certain what the financial impact of the action will be.

Philblack

Trading profits of Philblack rose from £436,195 to £746,687 for the year to March 31 1960, and the total distribution is increased from 12½% to 17½% by the addition of a 5% bonus to an unchanged 7½% final dividend.

Mr C. P. Dawnay, chairman, says the bonus dividend is in respect of a 'very satisfactory' year, and may not be repeated if present profits are not maintained.

Sales and production were the highest since the company commenced manufacturing carbon black, and, the chairman points out, in a business of this kind the ratio of profit rises as turnover increases.

Hecht Levis and Kahn

Hecht Levis and Kahn is effectively raising its dividend by 2½% to 15% for the year ended March 31 1960.

The higher dividend is recommended after taking into account the satisfactory preliminary results of the group to date, the directors state.

Group profit for the year, before tax, declined from £414,971 to £391,427.

PATENT SPECIFICATIONS

The following information is prepared from published Patent Specifications by permission of the Controller of H.M. Stationery Office. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, W.C.2, at 3s. 6d. per copy (including postage).

Ethylene Polymerization

No. 844,656. Imperial Chemical Industries Ltd. Application, March 5 1958. Filed, February 23 1959. Published, August 17 1960.

This patent relates to the manufacture of solid polymers of ethylene by irradiation with ultra violet light at normal temperature and pressure, in the presence of a compound of a transition element occupying one of the 4th to 10th places after the inert gas in one of the long periods of the periodic system of elements. The preferred compounds are volatile compounds of titanium, particularly the halides. The ethylene is partially or completely saturated with the vapour of the metal halide and irradiated by means of a low pressure mercury vapour lamp.

Adhesive Tape

No. 844,680. National Cash Register Company. Application and Filed, April 16 1959. Application in USA, May 28 1958. Published, August 17 1960.

Adhesive tape, including a base web, on one side of which is provided a coating including a finely divided substantially solid adhesive and a volatile solvent therefore, at least the solvent being contained as an inclusion within pressure rupturable microscopic capsules. When pressure is applied to the tape the capsules will be ruptured at the point of pressure to allow contact of the solvent with the adhesive to render the latter adherent. The adhesive containing capsules may be formed from a mixture containing gelatin, water, chlorinated rubber, chlorinated diphenyl, gum arabic and toluene.

Spraying Asbestos

No. 844,788. J. M. Roberts Ltd. Application, July 26, 1957. Filed, July 24 1958. Published, August 17 1960.

An apparatus consists of a hopper for asbestos fibre, with a bottom opening, a device for regulating the rate at which the fibre leaves the hopper, a rotary disc arranged below the hopper about a vertical axis to receive the fibre and fling it centrifugally outwards to form a suspension in air, and a fan to draw the suspension in and deliver it through a hose. This is used to spray the fibre on to a surface. The feeding of fibre at a regular rate and starting and stopping it as desired is a difficult problem, particularly with asbestos fibre which tends to cling together and form bridges over the outlet from any container into which it is put.

Polymer Compositions

No. 844,791. British Rubber Producers' Research Association and United Kingdom Atomic Energy Authority. Application, September 4 1957. Filed, September 4 1958. Published, August 17 1960.

Polymer compositions are produced by adding at least one olefinic monomer to at least one aqueous dispersion of a natural rubber latex and exposing the mixture to high energy radiation until a substantial proportion of the olefinic monomer or monomers has been polymerized.

Shorter Abstracts

Polypropylene Film Materials. 838,954. Montecatini Societa Generale per l'Industria Mineraria e Chimica. Filed, October 14 1957.—Tubular film materials are produced by extrusion of polypropylenes which are at least partly crystalline.

Ethylene - Propylene Copolymers. 838,963. Hercules Powder Co. Filed, May 15 1958. — Ethylene-propylene copolymers, which may contain a third unsaturated compound in the copolymer, are cross-linked by heating with a di(aralkyl) peroxide.

Processing of Polythene. 838,964. Hercules Powder Co. Filed, May 15 1958.—The properties of polythene or ethylenepropylene copolymers are improved by heating the polymer or copolymer with an organic peroxide of a specified general formula in the presence of carbon black.

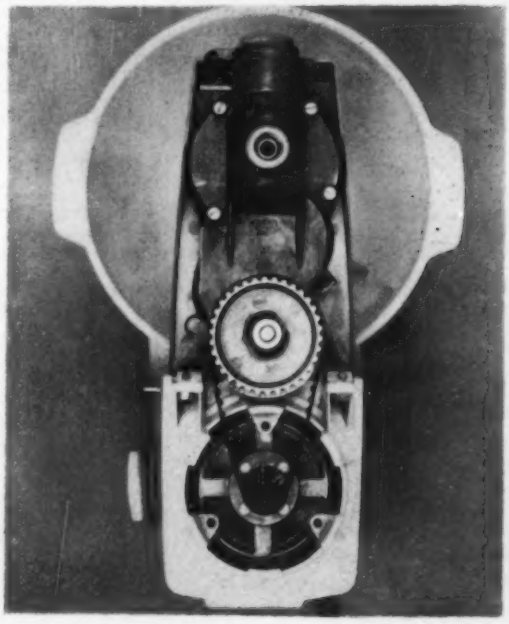
Irradiated Polythene. 840,070. Esso Research and Engineering Co. Filed, February 21 1958.—The melting point of polythene is increased by mixing 0.5 to 20% of a non-conjugated divinyl aromatic hydrocarbon monomer, *e.g.* divinyl benzene, with the polythene and then irradiating the mixture with high energy ionizing radiation.

Laminating Polythene and Rubber. 840,208. Hercules Powder Co. Filed, July 29 1958.—Polythene is bonded to natural or synthetic rubber to form a laminate by mixing an organic peroxide of a specified general formula with the polythene and with a vulcanizable composition of the rubber, bringing together sheets of the polythene and the rubber composition and heating under pressure.

Stabilized Polymers. 840,460. Western Electric Co. Inc. Filed, November 26 1957.—Polymers such as polythene and polypropylene are stabilized against thermal and ultraviolet degradation by the addition of carbon black and a specified type of sulphur-containing aliphatic compound.

Polypropylene-Silicone Polymer Blends. 841,070. Esso Research and Engineering Co. Filed, October 10 1958.—The low-temperature properties of linear polypropylene are improved by blending small proportions of silicone polymers with the polypropylene.

Vulcanizable Compositions. 841,159. O. W. Burke, Jun. Filed, November 7 1956.—The physical properties of vulcanized natural and synthetic rubbers are improved by incorporating cyanoalkylamines in the unvulcanized stock. Many examples are given.



The new Kenwood 'Chef' mixer incorporates a PowerGrip Timing Belt manufactured by The North British Rubber Co. This gives a compact non-slip transmission —free from initial tension — between motor and gearbox, resulting in smooth performance. Because of its construction the belt will stand up to sudden starts and rapid acceleration, and has found uses in a wide variety of transmission applications

Rubber and Plastics Stock Market

A REVIEW OF PRICES AND TRENDS

WHAT a pity that our athletes in Rome have been unable to produce the same kind of display seen on the London Stock Exchange over the past few weeks. With the real champion touch share prices have been setting their own kind of records. New all-time peaks have been toppled, and summits have been surpassed by more than one of the fast-growing number of indices which have been prepared for the investment public. Back from their holidays people took one look at the way things were going in the parish of Throgmorton Street and immediately slapped in their own buying orders. As the number grew so the shortage of stock became more of an embarassment to dealers. Try as they could, no one they turned to was a seller.

If the rialto keeps on the way it started the new account on Monday we will soon be saying again that they have never had it so good. The next hurdle to cross will be the trade figures which are due at the back end of this current trading period. A lot depends on the future way prices go on the export showing which has now probably become one of the most decisive factors behind the future of the country's economic trends. Our trading overseas has been a big disappointment and makes the possibility of an early cut in Bank rate a long shot chance over the near term. For the Government will undoubtedly take further unpopular measures in the financial field if exports fail to show signs of improvement.

Good news from the F. W. BERK directors. In a half-time report to shareholders they returned profits of £367,600 for the six months to June 30 which went against £292,000 in the similar period last year. The dividend was maintained at 2½d. per share but on a larger capital increased by the rights issue made to finance the SPENCER CHAPMAN investment. No dividend has yet been received from this source and it is probable that no income will arise until 1961.

LEYLAND AND BIRMINGHAM RUBBER made a splash with its announcement that the dividend was to go up 5% to 20%. Group net profits increased from £492,300 to £561,700 after tax of £376,100 against £255,800.

MONSANTO CHEMICALS was another well-known name to produce interim report. Net sales have improved to £10,373,600, a rise of just over £1,500,000 on the similar six month period of 1959. Net income also showed a handsome gain. The substantial increase, it was stated, was due

Continued on page 399

Share Price Movements

Par Value	Company	1960 High	Low	Aug. 27	Latest
£1	A.E. Ind. Ord.	67/-	48/10½	48/10½	50/9
5/-	Albright & W. Ord. ..	31/9	25/9	33/3	30/6
£1	„ „ „ 5% Pref.	17/3	15/6	16/-	15/3
5/-	Anchor Chemical Ord...	18/7½	14/9	16/9	16/6
5/-	Andersons Rub. Ord. ..	—	—	3/1½	3/1½
£1	Angus Geo. Ord. ..	54/-	34/9	46/6	54/-
5/-	Ault & Wiborg Ord. ..	25/3	20/-	25/-	25/1½
£1	Avon India Rubber Ord.	46/6	35/-	35/3	36/3
£1	„ „ „ 6% Pref.	20/-	17/6	18/9	18/9
10/-	Bakelite Ord.	62/6	39/9	62/3	62/-
£1	„ 6% Pref. ..	19/3	16/9	19/-	19/3
£1	Baker Perkins Ord. ..	45/6	40/-	42/9	45/6
4/-	Bank Bdg. Rubber Ord.	4/3	2/3	4/3	4/-
4/-	Brammer H. Ord. ..	18/6	16/9	18/6	18/4½
10/-	Bridge, David Ord. ..	66/6	53/6	66/3	66/6
5/-	Bright, John Ord. ..	18/6	15/3	18/-	17/3
5/-	Brit. Blting. & Asb. Ord.	—	—	17/3	18/-
£1	„ „ „ Pref.	—	—	17/3	17/3
2/-	Brit. Ind. Plas. Ord. ..	12/1½	5/3	9/7½	10/6
2/-	„ 10% (tax free) Pref.	4/9	4/3	4/9	4/9
£1	British Xylonite Ord. ..	112/6	78/9	107/6	112/6
£1	„ „ 5% Pref.	18/9	15/-	14/6	14/4½
£1	BICC Ord.	61/3	49/9	51/6	52/6
5/-	BTR Ind. Ord.	17/3	9/9	17/-	16/6
£1	„ „ 7½% Pref. ..	24/3	23/-	23/9	22/6
£1	Courtaulds Ord. ..	59/4½	44/3xc	56/6	59/4½
£1	„ 5% 1st Pref.	17/9	16/3	16/-	16/3
£1	„ 6% 2nd Pref.	21/-	19/-	19/-	19/1½
4/-	Cow, P. B. Ord. ..	9/6	6/9	8/9	9/-
£1	„ „ 5% Pref. ..	15/6	14/-	14/-	14/-
1/-	Dannimac Mfg. Ord. ..	12/9	9/-	9/9	10/9
10/-	De La Rue Ord. ..	91/-	65/6	91/-	78/-xc
£1	„ „ „ 3½% Pref. ..	12/-	10/6	9/9	10/3
10/-	Distillers Co. Ord. ..	45/7½	32/9	43/4½	45/7½
£1	„ „ 6% Pref...	22/-	19/6	19/6	19/6
£100	„ 5% Conv. Loan	£96	£95	£95	£96
£100	„ 5½% Unsec. Loan	£97	£87½	£87	£87½
10/-	Dunlop Rubber Ord. ..	30/6	21/9	29/6	30/4½
£1	„ „ 5½% Pref.	19/-	16/6	16/-	16/3
£100	„ 3½% 1st Debs.	£78	£68	£69	£70
£100	„ 4½% 2nd Debs.	£87	£80	£80	£80
£1	Eng. Elect. Ord. ..	53/6	36/3	38/6	38/-
4/-	Ebonite Cont. Ord. ..	14/3	11/-	11/3	11/6
£1	English China Clays Ord.	95/-	74/6	90/6	91/-
£1	Goodyear Tyre 4% Pref.	12/9	10/9	11/6	11/-
5/-	Greeff Chem. Ord. ..	35/-	23/6	24/-	24/3
10/-	Greeff Chem. 5½% Pref.	9/-	8/6	8/9	9/-

Par Value	Company	1960 High	Low	Aug. 27	Latest
5/-	Hackbridge Hldg. ..	17/6	14/3	14/10½	16/-
4/-	Greengate & Irwell Ord.	6/6	5/3	5/3	5/9
£1	Harrisons & Crosfield Dd.	64/-	49/6	51/3	54/4½
1/-	Hunt & Moscrop Ord...	2/9	1/9	2/3	2/-
£1	Imp. Chem. Ord. ..	71/3	56/6	64/7½	71/1½
£1	„ „ 5% Pref. ..	18/-	16/3	16/3	16/3
£100	„ 4½% Unsec. Loan	£89½	£81	£82½	£82½
£100	„ 5½% Conv. Loan	£212½	£90xc	£92½	£92½
1/-	Kleemann (O. & M.) Ord.	11/6	8/3	11/-	11/4½
£1	„ „ 6½% Pref.	19/-	17/-	17/6	17/9
2/-	Lacrinoid Prod. Ord. ..	5/-	3/-	4/9	4/6
5/-	Laporte Ind. Ord. ..	33/6	25/3	31/3	33/3
£1	„ „ 7½% Pref.	24/3	23/3	23/3	23/3
£1	Leyland & Birm. Rubber Ord.	63/-	46/3	51/10½	62/6
£1	„ „ „ 6% Pref.	19/-	17/6	18/9	18/9
2/-	London Rubber.. ..	14/9	11/-	13/1½	13/1½
£1	„ 6% Red. Cum. Pref.	20/-	18/9	18/9	19/6
£1	McKechnie Bros. Ord...	71/6	57/-	60/-	60/-
£1	„ „ 'A' Ord.	69/3	56/-	57/-	56/9
£1	„ „ 6% Cum. Pref.	18/-	16/-	17/-	17/-
5/-	Monsanto Chem. Ord. ..	28/-	23/3	28/-	27/9xd
£1	„ „ 3½% Pref.	12/9	12/-	12/6	12/6
£100	„ „ 6% Debs.	£103½	£98	£98	£99
5/-	Miles (H.G.) Holdgs. Ord.	11/3	9/9	10/-	10/-
£1	North British Rubber ..	21/3	16/6	16/9	16/-
5/-	Northwestern Rubber ..	—	—	11/9	13/-
5/-	Plastic Enginrs. Ord. ..	30/-	20/-	26/3	30/-
5/-	Redfern Holdings Ord...	5/9	4/3	5/-	5/-
2/-	RFD Ltd. Ord.	6/6	4/9	4/9	4/6
£1	„ „ 5½% Pref. ..	14/6	12/9	13/-	13/9
2/-	Rubber Imp. Ord. ..	7/9	4/6	4/6	5/-
2/-	„ „ 'A' Ord. ..	7/-	3/3	3/3	3/9
£1	„ „ 5% 1st Pref.	15/-	11/3	12/3	12/3
5/-	Rubber Reg. Ord. ..	19/3	17/-	17/-	17/4½
4/-	Shaw Francis Ord. ..	27/6	21/3	23/-	23/3
2/-	Silentbloc Ord.	13/3	10/-	12/-	12/6
5/-	Storey Bros.	41/3	28/3	40/3	41/-
2/-	Sussex Rubber Ord. ..	2/3	1/3	2/-	2/-
5/-	Sutcliffe Speak Ord. ..	15/9	11/-	13/6	13/6
£1	Turner & Newall Ord...	115/-	100/-	112/6	62/6xc
£1	„ „ „ 7% Pref.	25/-	22/3	22/3	22/9
5/-	Universal Asbestos Ord.	50/-	32/6	26/3xc	27/3
5/-	Viscose Dev. Ord. ..	16/6	14/9	16/-	16/3
5/-	Warne W. (Holdgs.) Ord.	18/9	15/3xc	16/6	17/9

Rubber Markets

LONDON

Prices moved in a wide range, mainly in sympathy with fluctuating levels at Singapore. The market remained in an uncertain mood and for the most part trading was more of a covering nature than new business. Squaring of accounts for the end of August enlivened the market but later dull conditions were resumed.

Latest prices are as follows:

No. 1 RSS Spot: 28⅞d.-29⅛d.

Settlement House:

October 28⅞d.-29⅛d.
November 28¾d.-29d.
December 28¾d.-28⅞d.
October/December 28¾d.-29d.
January/March 28⅛d.-28⅜d.
April/June 27⅞d.-28⅛d.
July/September 27⅝d.-27⅞d.

No. 1 RSS cif basis ports:

September 28¾d.-29d.
October 28⅜d.-28⅞d.
November 28⅝d.-28¾d.

Godown:

September 99 Straits cents nominal.

LATEX

Centrifuged 60% latex per gallon in drums, seller, September, October, 16s. 3d., cif European ports. Spot, seller, 16s. 11d. Bulk, nominal, d.w. 16s. 6d. nominal, August. Creamed, seller, 15s. 11d. nominal, September, October. Normal, seller, September, October, 14s.

BANGKOK

No. 1 RSS

The price of No. 1 RSS at Bangkok on September 5 was 32.50 (33.00) US cents per lb.

SINGAPORE

After opening around previous levels on September 5 the market tended higher on some shortcovering and sellers reserve. Conditions were quiet. Physicals were neglected. The afternoon was quiet. Prices were rising initially then falling back slightly. After hours, the market was barely steady.

	Malayan cents per lb., fob Malayan ports to open ports	
	Sept. 5	Prev. Close
No. 1 RSS, Sept.	102¾–103	101⅝–101⅞
Oct.	102 –102½	100½–101⅛
No. 2 RSS, Sept.	101½–102½	100½–101½
No. 3 RSS, Sept.	100½–101	99½–100⅜
No. 4 RSS, Sept.	99 –100	97½– 98½
No. 5 RSS, Sept.	95⅜– 96⅜	94½– 95½
No. 1 RSS, Spot	102⅛–102⅜	101⅛–101⅞
No. 3 blanket thick remilled crepe, Sept. ..	89½– 90½	87½– 89
No. 1 fine pale crepe, Sept. ..	110 –111	109 –111
2x thin brown, Sept. ..	88½– 89½	87½– 89

Tone: Steady

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums, fob at 194.60d. per gallon.

NEW YORK

The New York rubber market ruled as under on September 6:

DEALERS' PRICES

	US cents per lb., ex-dock	
	Sept. 6	Previous
No. 1 RSS, Sept. ..	34½a	35½a
Oct. ..	34a	34⅞a
No. 2 RSS, Sept. ..	34⅝a	35⅛a
Oct. ..	33⅞a	34⅛a
No. 3 RSS, Sept. ..	34⅛a	35a
Oct. ..	33⅞a	34⅛a
No. 1 RSS, Spot ..	34⅜n	35⅜n
No. 3 amber blanket crepe, Sept. ..	28a	28½a
No. 1 latex thin crepe, Sept.	—	—
No. 1 latex thick crepe, Sept.	—	—

FUTURES—REX CONTRACT

	Sept. 6	Prev. Close
Sept. ..	34.50b–34.60a	35.60t
Nov. ..	33.80t	34.35b–34.60a
Jan. ..	33.10t	33.60b–33.65a
March ..	32.50b–32.65a	33.00b–33.15a
May ..	32.30b–32.40a	32.60b–32.90a
July ..	32.10b–32.20a	32.20b–32.50a
Sept. ..	31.85b–32.10a	31.80b–32.10a

Sales: 73. Tone: Easy.

Futures were easy in early trading on September 6, under the lead of nearby September on scattered selling. Traders said the London decline and the quietness of physicals contributed to the selling. Dealings were thin. Later, the nearby September position continued easy, down about ⅞ of a cent per lb., on liquidation. The other months were moderately lower for the day. In the closing stage futures continued easy. Nearby September declined about a cent for the day.

AMSTERDAM

The Amsterdam rubber market ruled as under on September 5:

No. 1 RMA	Guilders per kilo	
	Sept. 5	Previous
September	2.88	2.88
October	2.87	2.87
November	2.86	2.86
December	2.85	2.85
Oct./Dec.	2.86	2.86
January	2.80	2.80

Sales: Nil. Tendency: Quiet.

DJAKARTA

About nine tons of sheet No. 1 for ready delivery were sold at 38.50 rupiahs per kilo on September 5. The market closed steadier, reflecting the better overseas market development.

	Rupiahs per kilo	
	Sept. 5	Previous
Spot No. 1 priok ..	37.50	37.50
Spot No. 2 priok ..	36.00	36.00
Spot No. 3 priok ..	33.00	33.00
No. 1 fine pale crepe, Spot	35.00	35.00

Tone: Easier

CEYLON

No. 1 RSS

The price of No. 1 RSS at Colombo on September 5 was 111 Ceylon cents per lb.

STOCK MARKET

Continued from page 398

in some measure to the new polythene plant at Fawley having come into full operation. During the first half of last year it was just coming on stream and as reported made no significant contribution to sales, while its development expenses were charged against profit.

ALBRIGHT AND WILSON have raised their interim too. In this instance it has gone up from the equivalent of 4.8% to 6%. Compared with a year ago the dividend is also payable on a capital increased by shares issued in exchange for those acquired in A. BOAKE ROBERTS. Six months' profits worked out at £3,962,000. Corresponding figures were £3,545,000 for the group as then constructed and £3,806,000 including those of Boake Roberts. Profits for the first half of the current year were affected by increased competition especially in Canada and Australia.

The Canadian results were also influenced by the recession in the uranium industry. The full effect of these factors will be felt in the second half of the year but profits for 1960 as a whole, as indicated earlier this year, are not expected to differ significantly from the comparable figures for 1959.

Asbestos Exports Up

Shipments of asbestos from Canadian mines declined slightly in July compared with same month of last year, but in the seven months period they were higher.

Shipments in July amounted to 92,529 tons compared with 94,898 in July 1959, while January-July shipments were higher at 600,151 tons against 566,995.

Exports of asbestos in June rose to 104,335 tons from 94,365 in the same month last year, the latest report indicated, bringing the half-year total to 474,771 tons against 458,290.

Polypropylene in Holland

Bataafse Petroleum Maatschappij and Montecatini, of Milan, are to form a joint company in Holland for the large scale manufacture, initially, of polypropylene.

The new company, to be called Rotterdamse Polyolefinen Maatschappij will build plant near Rotterdam.

The next Plastics Institute examination will be held from June 12-17 1961.

Industry INTELLIGENCE

Machines, Materials and Equipment

Pressure-Sensing Conveyor

Noted in *European Technical Digests* is a new form of conveyor which uses spring operated pressure wheels to apply a pressure between the power belt and the load. As a result of this intermediate link, a carton or other load on the moving conveyor can be held stationary or pushed backwards by finger pressure; this feature is useful for spacing out loads or inserting an additional load into the line. Similarly, an accumulated load of cartons can be released, one at a time and spaced out as desired by hand control. The clutch action of the pressure wheels ensures the drive is taken up smoothly, a useful feature with delicate loads, or those with a high centre of gravity.

The presence of the pressure wheel link between the load and the power belt also reduces pressure on the belt with accumulated loads, and reduces starting loads since accumulations are released one at a time.

This reduces both wear on the driving mechanism and overall power requirements.

The conveyor is made by Manufacturer's Equipment Ltd., Sutton Road, Hull, Yorks.

Technical Data

Medium Impact Geon PVC

British Geon Ltd. has now started production of a new unplasticized PVC compound, Geon RA.130. This possesses good impact strength properties and is designed for use in all profile extrusions and for most pipe applications. Tougher than other medium impact unplasticized PVC compounds made by British Geon Ltd., sheet made from RA.130 has a tensile strength greater than 7,000lb./in.², izod impact strength greater than 5ft. lb./in. and softening point 79°C. Further details are given in information sheet G109 available from British Geon Ltd., Devonshire House, Piccadilly, London, W.1.

Polysar Foam Rubbers

Latex foam rubber compounding with Polysar latex 722, Polysar Krylene 602 sponge weatherstrip and Polysar butyl 402 closed-cell sponge weatherstrip, are the titles of the three most recent technical reports issued by Polymer (UK) Ltd., Walbrook House, Walbrook, London, E.C.4, Nos. 9:7A, 9:7B, 9:7C.

Latex foam rubber compounding, processing and testing are discussed in detail in the first of these reports, and tabulated data are presented to show the physical properties of foam made with various ratios of natural rubber latex and Polysar Latex 722. In introducing a new product for use in foam rubber, designed originally for natural latex, most producers will start by using low proportions of the new material and gradually work up to higher levels. This report is written with this procedure in mind.

Polysar Krylene 602 is a low viscosity, non-staining, cold polymerized rubber designed for easier processing. The report describes a sponge weatherstrip based on 602 with relatively low levels of plasticizer and filler. This produced a very uniform and resilient sponge which extruded quite smoothly despite the low temperatures used to prevent premature release of the blowing agents.

Polysar butyl 402 is recommended for use in sponge weatherstripping because of its fast cure rate, good ageing properties and non-staining characteristics. The report describes one such compound which has low density, good skin and, because of its closed cell structure, good resilience.

Publications

Saroy Polystyrene Sheet

A new manual has been issued by Saro Products Ltd., manufacturers of Saroy high impact polystyrene sheet.

This manual gives comprehensive information on various aspects of high impact polystyrene sheet. It is divided into three sections, the first giving a general description of the material, finishes, sizes, guages, colours, applications and physical and chemical properties. The second section gives details of forming operations, machines and moulds and their suppliers, and section three is devoted to post forming operations such as machining, cleaning, bonding, printing, welding and flock spraying.

Blow Moulding

A new technical brochure explaining how changes in polythene resin properties and extrusion and moulding factors affect the properties of blow moulded items has been published by US Industrial Chemicals Co. of New York.

Called 'Blow Moulding: How to Obtain Highest Quality and Production Rate,' the brochure notes that such desired properties as stiffness, stress crack resistance and gloss are affected by resin density, melt index, extrusion melt temperature, blow pressure, die opening and other factors.

Compromises are necessary to achieve the proper balance of properties and economic operation. Thus, it is necessary to compromise between gloss and minimum mould cycle time, for instance.

RABRM Abstracts

Rubber Trade Developments Vol. 24, No. 6, recently published by the Research Association of British Rubber Manufacturers, lists details of trade developments which have occurred recently. Information is given on new companies formed, trade agreements made between British and foreign companies, planned extensions to production capacities and other items of news which have appeared in the columns of *RJIP* and other technical journals.

Foreign Rubber Patents Vol. 27, No. 7, gives abstracts of foreign rubber patents which have not been included in the other two patent publications of RABRM, Rubber Abstracts and British Rubber Patents. This work is divided into three parts, parts I gives abstracts of patents, part II notes French, German and US patents to which equivalents have already appeared in one of the RABRM publications and part III deals with official notices and patent literature.

Aeroweb Honeycombs

Technical notes 212, from the Technical Service Department of Ciba (ARL) Ltd., is called 'The Bluebird C.N.7,' and is devoted to a description of the main and auxiliary beams of the car. These beams are all built of 18swg. alloy facing sheets with ¾in. of honeycomb core material in between.

All of these structures are made using Redux and Hidux film adhesives in which the bonding agents are incorporated in a glasscloth carrier; bonding takes place in one operation under heat and pressure. Ciba adhesives are also used in the suspension units of the car.

Splicing Tread Rubber

The Retread and Repair Materials Committee of the Rubber Manufacturers' Association Inc., 444 Madison Avenue, New York 22, N.Y., has just released the eleventh in a series of bulletins relating to the retreading and repairing of tyres.

Called 'Splicing of Tread Rubber,' it details shop practice for accomplishing most efficient splicing of tread rubber made of either natural or synthetic.

British Standards

Identification of Pipelines

This revised British Standard (BS 1710:1960) gives recommendations for an identification colour code for pipelines. It applies to lines in buildings, industrial installations and on water and land transport.

Ground colours are specified to distinguish between the various classes of contents — white for air, canary yellow for town gas, dark grey for chemicals and so on. Colour bands are specified to individualize within classes; for example, a pipe containing butane would be dark grey, with a red band; one containing carbon monoxide would be dark grey with red and yellow bands. Lettering is recommended in certain instances.

Hazard markings have been introduced for use when the contents of a pipe may be radioactive. A pipe with a light orange ground and black diagonal crossed stripes, for example, indicates the presence of heavily radioactive hazards.

The 16-pp. standard contains five pages of fully annotated colour diagrams.

The address of the British Standards Institution Sales Branch is 2 Park Street, London, W.1

Bongos and Roses

Autumn plans for Fablon Ltd. include the introduction of six fresh designs and a new look national advertising campaign.

The designs include a pink 'American Rose' pattern on a white background; 'Off Beat,' a modern design of bongo drums and rock 'n roll dancers, and 'Garland,' a new floral design in pastel colours.

Full page colour advertisements are booked in the woman's Press for the campaign starting on September 14.

Walker, Crossweller

Walker, Crosweller, of Cheltenham, have opened a new office block in the town.

This houses their sales and service departments, which retains the old telephone number (Cheltenham 56317) and address. Departments at the factory (accounts, works offices, buying and publicity) have a new number: Cheltenham 56366.

Latices Plant for UK

Witco Chemical Co. and US Rubber are to form a new company, Sto-Chem Ltd., to make synthetic latices in the UK. Plant with a capacity of 8m. lb. will come on stream in autumn 1961. Investment is about £1m.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

LUSTRASOL (797,594) Synthetic resins and solutions thereof, all for use in manufactures. Beck, Koller and Co. (England) Ltd., Beckacite House, Edwards Lane, Speke, Liverpool, 24. (Class 1; August 16 1960).

AVAPLENE (793,631) Material included in Class 17 in the form of sheets made wholly or principally of plastics, and laminations of plywood and plastics, the plastics predominating. Homeworthy Guaranteed Furniture Ltd., 20 Angel Factory Colony, Edmonton, London, N.18. (Class 17; August 16 1960).

MERAKLON (801,982) Cords, non-metallic ropes, strings, nets included in Class 22, tents, awnings, sails, sacks; stuffing materials included in Class 22, and raw fibrous textile materials. Montecatini Societa Generale per L'Industria Mineraria E Chimica, 18 Via Filippo Turati, Milan, Italy. Address for service is c/o Eric Potter and Clarkson, 317 High Holborn, London, W.C.1. (Class 22; August 16 1960).

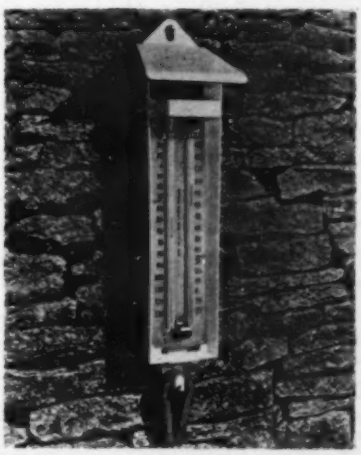
DECORIL (799,501) All goods included in Class 17. Rubber Improvement Ltd., Rilex House, Chandos Street, London, W.1. (Class 17; August 16 1960).

INTERVULC (798,306) Vulcanising preparations and rubber cements and rubber solutions. Stahlgruber Otto Gruber and Co., Rosenheimerstrasse 17, Munich, 8. Address for service is c/o Reddie and Grose, 6 Bream's Buildings, London, E.C.4. (Class 1; August 23 1960).

KLEEWARE (B798,881) All goods included in Class 8. Kleeware Plastics Ltd., 17 Winchester Road, London, N.W.3. (Class 8; August 23 1960).

ESTAR (797,218) Materials made of plastics in sheet or strip form and included in Class 17, all being for use in the manufacture of photographic materials. Kodak Ltd., Kodak House, Kingsway, London, W.C.2. (Class 17; August 23 1960).

POLYFREEM (803,646) Foamed plastics in the form of blocks, shaped sections and sheets, all for use in manufacture. Polyfreem Ltd., 897 Christchurch Road, Boscombe, Hampshire. (Class 17; August 23 1960).



To meet exposure to all weather conditions a casing in BRP's Styron 475 polystyrene is now being used by G. H. Zeal Ltd. for the housing of this new maximum and minimum registering thermometer

PATENT LIST

Printed copies of the Specifications in the following list, published by permission of the Controller of H.M. Stationery Office, can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on August 10 1960

Styrene Products Ltd. High impact polymerised vinyl aromatic compounds. 843,729.

Midland Silicones Ltd. Organosilicon compounds. 844,421.

Midland Silicones Ltd. Siloxane elastomers. 844,128.

Midland Silicones Ltd. Chlorosiloxanes. 844,279.

N.V. De Bataafsche Petroleum Maatshappij. Elastometers. 844,204.

Farbenfabriken Bayer A.G. Interpolymers of low inflammability. 843,746.

United States Rubber Co. Plastic compositions. 844,141.

Dow Chemical Co. Moulding grade copolymers and process for preparing the same. 843,896.

C. Borello. Flexible plastic container and method of making same. 843,749.

De Bataafsche Petroleum Maatschappij N.V. Polymerization of olefins, and the resulting polyolefins. 843,750.

Firestone Tire & Rubber Co. Pneumatic tyre construction. 844,150.

Farbenfabriken Bayer A.G. Production of stable polychloroprene. 843,906.

E. I. Du Pont De Nemours & Co. Artificial continuous filament yarns. 844,024.

N.V. Onderzoekingsinstituut Research. Rubber articles provided with reinforcement layers. 844,035.

Phillips Petroleum Co. Method for coating pipe with olefin polymers. 844,299.

Petrochemicals Ltd. Production of solid polymers of unsaturated hydrocarbons. 844,437.

Open to public inspection on August 17 1960

G. Angus and Co. Ltd., E. T. Jagger and B. Walton. Apparatus for the production of rubber rings. 844,843.

G. Angus and Co. Ltd., E. T. Jagger and B. Walton. Production of rubber rings. 844,844.

Dunlop Rubber Co. Ltd. Damped resilient units. 844,750.

Geigy Co. Ltd. Pigment pastes and the manufacture thereof. 844,751.

United Aircraft Corporation. Expandable resin compositions. 844,682.

Farbenfabrik Wolfen Veb. Process for the manufacture of synthetic resins. 844,687.

Minnesota Mining and Manufacturing Co. Polyester bonded-fibre fabric. 844,760.

Phillips Petroleum Co. Process for polymerization of isoprene and polymers so produced. 845,200.

Ciba Ltd. Polyglycol ether derivatives and process for their manufacture. 845,286.

American Sisalkraft Corporation. Adhesives and laminates formed therewith. 845,290.

Distillers Co. Ltd. Polymerization process. 844,769.

Ruhrchemie A.G. Process for the polymerization of olefins. 844,864.

Spinnfaser A.G. Machine for spinning regenerated cellulose filaments from viscose. 845,114.

Increases of Capital

Tellforms Ltd. (640,816).—Tyre manufacturers, etc., 31 Bedford Street, W.C.2. Increased on February 11, 1960 by £4,900, in £1 ordinary shares, beyond the registered capital of £100.

Greenland Rubber Co. Ltd. (563,316).—Greenland Mills, Bradford on Avon, Wilts. Increased on January 31, 1960 by £3,000, in £1 shares, beyond the registered capital of £100.

Kalumpong Rubber Estates Ltd. (643,676).—30-33 Minories, E.C.3. Increased on January 28, 1960 by £399,900, in £1 ordinary shares, beyond the registered capital of £100.

Bardex (Plastics) Ltd. (432,822). 119 Guildford Street, Chertsey, Surrey.—Capital increased by £35,000 in £1 ordinary shares, beyond the registered capital of £25,000, on February 18 1960.

NEW COMPANIES

Borough Tyre Co. Ltd. (667,767).—August 16. Capital: £20,000 in £1 shares. To acquire the business of a tyre distributor carried on by John G. Green at Oxton, Birkenhead, as 'The Borough Tyre Depot,' etc. The directors are: John G. Green and Muriel Green, both of 42 Christchurch Road, Oxton, Birkenhead. Regd. office: 1a Village Road, Oxton, Birkenhead.

BASF Chemicals Ltd. (667,980).—August 18. Capital: £50,000 in £1 shares. To carry on the business of manufacturers of and dealers in chemicals, dyes, plastics, recording tapes, fertilizers, varnishes, solvents, etc. Regd. office: 30 Southampton Buildings, Chancery Lane, W.C.2.

Philitanks Ltd. (668,154).—August 19. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in glass fibre and synthetic resin materials. The directors are: Cyril A. Gill, 22 Evelyns Close, Hillingdon, Middlesex; Kenneth H. Gill, 15 Austins Lane, Ickenham, Middlesex; William G. Wyver, 395 Pinner Road, Harrow, Middlesex. Regd. office: 86a High Street, Southall, Middlesex.

Holland & Harrison Ltd. (668,309).—August 23. Capital: £100 in £1 shares. To carry on the business of manufacturers, producers, and moulders of and dealers in plastics and plastic materials, substances, goods of all kinds, etc. The directors are: Percy W. Holland, 17, Barnhurst Path, South Oxhey, Watford, toolmaker; James C. Harrison, 55 Alveston Avenue, Kenton, Middlesex, toolmaker; Mrs Theresa E. Holland; and Mrs Renee D. Harrison. Regd. office: 23 Peterborough Road, Harrow, Middlesex.

Polycell Manufacturing Co. Ltd. (668,195).—August 22. Capital: £10,000 in £1 shares. To acquire such part of the assets and undertaking of Polycell Products Ltd. in the UK and elsewhere, as comprises the manufacturing and production activities now carried on by the said company, and in particular the manufacture and production of the products known as 'Polycell,' 'Polyfilla,' 'Polypeel' and 'Polylina.' The directors are: Joseph Shaw, 'Greenways,' West Common Road, Keston, Kent; Reginald F. Inch, 10 Homelands, Epsom Road, Leatherhead (directors of Polycell Holdings Ltd., etc.). Regd. office: 73 Highgate Road, Kentish Town, N.W.5.

Uniplast Compounds Ltd. (668,356).—August 23. Capital: £1,000 in £1 shares. To carry on the business of selling agents of any company organisation or person engaged in the manufacture of thermoplastic moulding compounds. Solicitors: Slaughter and May, 8 Austin Friars, E.C.2.

R·F·I·P· CLASSIFIED ADVERTISEMENTS

APPOINTMENTS VACANT

6d. a word, Minimum 10/-. Box 2/-.

HALEX REPRESENTATIVE. Applications are invited from men residing between Manchester and Birmingham to represent the company in a range of plastic injection moulded and vacuum formed products for the car, refrigerator and other industries. An applicant with experience of this business would be preferred. Age should be between 30 and 40. This is an interesting post, which has arisen owing to expansion, and could be progressive for a suitable candidate. An attractive salary will be paid together with a bonus on the company's results and a car will be provided. Applications marked confidential and giving full details of qualifications and experience should be addressed to the Personnel Manager, Halex, Highams Park, London, E.4. Interviews can be arranged in the North and Midlands. (511)

HALEX INDUSTRIAL SALES. Applications are invited from men between the ages of 20 and 30, preferably with Sales experience in the plastics industry, for an interesting vacancy which has arisen in the Industrial Sales Department of this Company. The Company is engaged primarily on injection moulding and vacuum forming of plastics; the post, which has arisen owing to expansion, will involve contact with industrial customers both in the office and outside. There is considerable scope for advancement. An attractive salary will be paid together with an annual bonus on the company's results. There is a pension scheme. Applications marked confidential and giving full details of experience and qualifications should be addressed to the Personnel Manager, Halex, Highams Park, E.4. (510)

APPOINTMENTS VACANT

(continued)

A.I.D. inspector required immediately for rubber oil seals and aircraft fuel hose. Experience in above desirable but not essential. Fully conversant with A.I.D. procedure and able to take charge of small inspection shop. Good salary, pension scheme, etc.—Apply in writing with full details to B.A.L. Ltd., Polypac Works, P.O. Box No. 32, Oakeywell Street, Dudley. (523)

ESTIMATOR and rate fixer required by progressive company in Bedfordshire. Young man with experience in plastics, rubber or motor industry preferred.—State age, experience and salary required to Box 520. (520)

OPPORTUNITY for two or three live and experienced mechanical sales representatives, London company, territories available Greater London, Midlands and Northern. Salary commensurate with experience, plus commission and expenses. Write in strict confidence—Box 467. (467)

RUBBER chemist with extensive SBR compounding experience is required by leading rubber manufacturer. Position comprises assisting our European Agents in solving technical problems arising in customers' plant. Extensive travel on Continent and in UK involved. Linguistic ability essential. Write in confidence, stating salary requirements.—Box 490. (490)

COMMONWEALTH OF AUSTRALIA

DEFENCE STANDARDS LABORATORIES

PLASTICS CHEMISTRY

The Department of Supply invite applications for the following vacancy at the Defence Standards Laboratories, Melbourne:

POSITION: SENIOR EXPERIMENTAL OFFICER

SALARY: £2,135-£2,330 (Australian currency).

DUTIES: Developmental and investigational work on plastics with particular reference to evaluation and application of new materials. Provide a consultative and advisory service in the field of plastics.

QUALIFICATIONS: Degree or equivalent qualification preferably in Chemistry. Extensive experience in the above field.

TRAVEL: Under specified conditions, first-class air/sea transport for the appointee and dependants (wife and dependent children) will be provided by the Commonwealth.

CONTRACT TERMS: If desired by the successful candidate consideration may be given to entering into an agreement for a three (3) or five (5) year contract of employment in Australia.
In this case the Commonwealth will bear the cost of return fares, together with the cost of removing the successful candidate's furniture and effects up to a maximum cost of £500 (Aust.), £250 each way.

APPLICATIONS: Forms obtainable from the Senior Representative (AV.74/8), Department of Supply, Australia House, Strand, London, W.C.2., with whom completed applications should be lodged as soon as possible. (512)

APPOINTMENTS VACANT

Production Management

NORTH BRITISH RUBBER

affiliated to

U.S. RUBBER OF AMERICA

require a Departmental Manager for the Heathhall Factory, Dumfries. This position would suit a man with an Engineering background who is interested in Production Management as applied to rubber processing operations, including calendering, spreading and continuous vulcanizing. The position is an interesting and important one which will be well remunerated. Contributory superannuation scheme, free Life Assurance and assistance with removal expenses. Applications marked P.M. giving full details of age, experience and present salary should be addressed to Industrial Relations Division, The North British Rubber Co., P.O. Box 47, Castle Mills, Edinburgh, 3. (462)

Rotocures

NORTH BRITISH RUBBER

affiliated to

U.S. RUBBER OF AMERICA

require a Superintendent for the Rotocure department of the Heathhall Factory, Dumfries. Candidates for this key position must have had experience in the efficient operation of continuous vulcanizing equipment and the production of PVC and rubber belting, rubber flooring and matting. Experience of modern management techniques and a thorough knowledge of Rotocure equipment is essential. Contributory superannuation scheme, free Life Assurance and assistance with removal expenses. Applications marked R giving full details of age, experience and present salary should be addressed to Industrial Relations Division, The North British Rubber Co., P.O. Box 47, Castle Mills, Edinburgh, 3. (463)

APPOINTMENTS VACANT
(continued)

RUBBER company situated in South Wales, specialising in the manufacture of precision engineering components and high pressure hose, require two assistant chemists/technologists. It is anticipated that successful applicants will be 20-28 years old, educated to L.I.R.I. standard, possess a sound knowledge of synthetic rubbers and be capable of working with the minimum of supervision.—Reply in confidence stating salary required to Box 519. (519)

SENIOR latex chemist required. Good prospects for right man. Pension scheme in operation.—Write stating age, experience and salary required to Rubber Latex Ltd., Harling Road, Wythenshawe, Manchester, 22. (513)

SENIOR MOULD DESIGNER. Experienced man, preferably with H.N.C. or similar qualifications is required for a wide variety of rubber and plastic mould design work. Good salary and bonus, with excellent prospects of advancement for suitable applicant.—Box 517. (517)

APPOINTMENTS WANTED

6d. a word, Minimum 10/-. Box 2/-.

EXECUTIVE, 36, with drive and ambition, experience general and technical management, sales, production, technical service and development work, seeks position where there is scope to use wide experience.—Box 516. (516)

RUBBER technologist, 30, A.I.R.I., with executive ability seeks responsible post. Widely experienced and able to fill laboratory, production, development or technical service appointment.—Box 522. (522)

Donald Leaver Limited

1 LONDON ROAD, STAINES, MIDDX. Phone STAINES 55271-2

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BLACKFRIARS 24 x 12 rotary cutter with 20 h.p. motor and starter. One complete set of spare knives, together with pneumatic take-off equipment, vibratory screen and steel staging. The above comprehensive equipment is in excellent condition and is available immediately. Price complete £800. Ex works.—Box 359. (359)

VULCANISER (Autoclave), 8ft. int. dia. x 14ft. long, fitted with quick closing door and safety device; 100lbs. w.p. and vacuum tested 200lbs. p.s.i. All mountings, rail track, bogies, air compressor, air receiver, vacuum pump, motors, etc. Very little used, condition equal to new.—Apply Box 521. (521)

'COTSWOLD' dipping machines and circulating tanks for latex and PVC. New catalogues now available on request.—Lionel Hook and Sons, Ebley, Stroud, Glos. Tel.: Stonehouse 614/5. (380R)

MANUFACTURERS of roughing machines for rubber sheeting, sponge rubber, splitting machines, leather cloth plant, embossing plates and rollers, spreading machines and presses.—G. L. Murphy Ltd., Imperial Works, Menston, Nr. Leeds. (238R)

NO. 11 Banbury with 250 h.p. drive. K.4 Intermix with 110 h.p. drive. 50in. x 20in. single geared mill with motor drive. 8½-in. strainer extruder with 40 h.p. drive.—Reed Brothers (Engineering) Ltd., Replant Works, Woolwich Industrial Estate, London, S.E.18. Tel.: Woolwich 7611 (6 lines). (518)

STEAM-HEATED rubber vulcanizing oven, 4ft. dia. x 6ft. long, in first-class condition.—Box 358. (358)

MACHINERY WANTED

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BELTING press, complete with gripping and stretching gear, valves and piping, etc. 30in. wide by about 20ft. long. 18in. daylight. P.P. 500lbs. p.s.i. approx. Hydraulic W.P. 1 ton p.s.i.—Box 514. (514)

WANTED. Hydraulic upstroke press, 4-6 daylights, electrically heated preferred. Minimum 20in. x 20in. table. Also pump, etc.—Crispin Supplies Ltd., Robinson Road, Leicester. (508)

AUCTIONS

5s. 6d. per line

By Order of The Directors of Renown Tyre & Rubber Co. Ltd.
F. S. AIREY, ENTWISTLE & CO.
are instructed to OFFER FOR SALE BY AUCTION on the premises on THURSDAY, 22ND SEPTEMBER, 1960, at 11 a.m., subject to conditions of sale and unless previously sold by private treaty the
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WELLINGTON RUBBER WORKS
CLAYTON-LE-MOORS,
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including
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The Solicitors, Messrs. Skelton & Co., 90, Deansgate, Manchester, 3.
or from The Auctioneers, 45, Cross Street, Manchester, 2, and 18, Wood Street, Bolton. (507)

TRADE SERVICES

6d. a word, Minimum 12/6 Box 2/-

PVC extrusions for the trade.—Esco (Rubber) Ltd., 34/36 Somerford Grove, London, N.16. (80)

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THE Castle Rubber Company Co., Ltd., Warrington, have a vacancy for an experienced sales representative in the London and Home Counties area. Must be car owner. Salary, expenses, commission. Contributory superannuation scheme. Replies will be treated in confidence. (494)

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Applications giving details of experience and salary required should be addressed to:—Sales Director, Sorbo Ltd., Woking, Surrey. (505)

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BUSINESSES FOR SALE

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6d. a word, Minimum 12/6 Box 2/-

MOULD makers who can guarantee to make and keep promises of delivery are invited to send details of their facilities to Box 496. (496)

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Address Box Number replies to:
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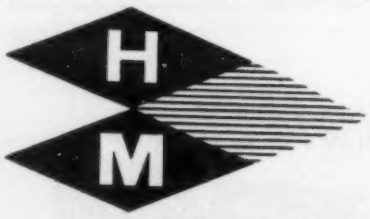

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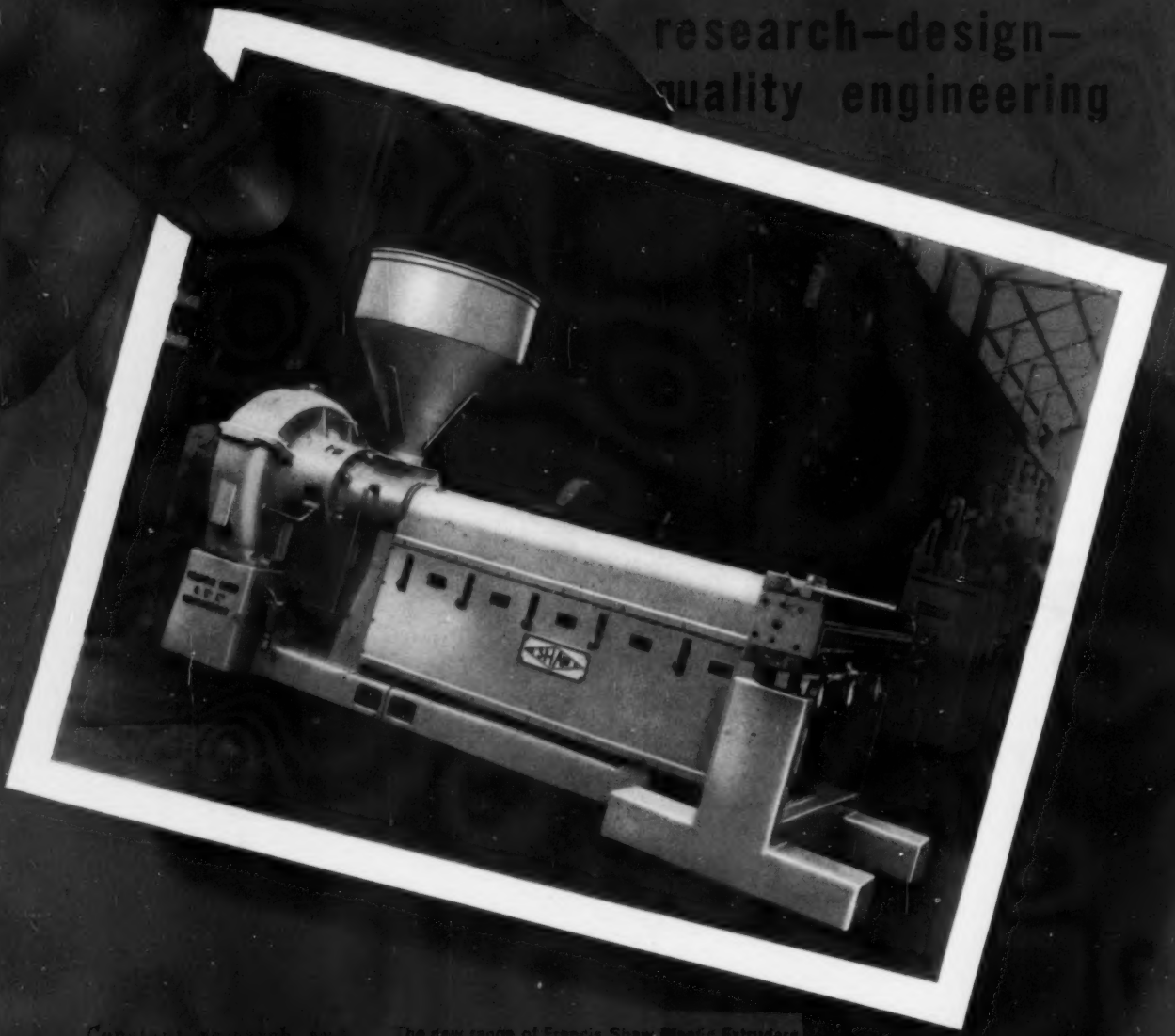

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